Food Manufacture

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Canned Tomato Juice in India.

THE American Trade Commissioner at Calcutta has recently advised the Department of Commerce that there is a possibility for developing a market for canned tomato juice in India. It is believed that a little display advertising and salesmanship would result in Indian hotels and catering establishments featuring the tomato juice cocktail during the many hot months in that country.

New Zealand Confectionery.

It is reported from Wellington that Messrs. Cadbury and Fry have combined with a local candy concern to manufacture in New Zealand.

As regards the confectionery, biscuits, and ice-cream trade in New Zealand, the ratio of production to consumption has increased from 82 per cent. in 1928 to 86 per cent. in 1929. The domestic production for the year ended March 31, 1929, amounted to about £1,635,000; whereas the value of the imports for the calendar year 1929 amounted to about £272,000 and the exports about £7,000.

It is stated that tea-tree honey, which possesses a strong flavour, will soon be marketed.

Butter and Margarine in Sweden.

Sweden represents the highest *per capita* purchasing power in Europe. Figures have just been published indicating the consumption of butter and margarine to-day as compared with pre-war days. Since 1913 the production of dairy butter has increased 30·3 per cent., while external consumption has increased 94·7 per cent. Between 1913 and 1928 the production of margarine increased 115·2 per cent., while the consumption went up by 121·5 per cent. Since 1913 the *per capita* consumption of all kinds of butter has increased by 12·5 per cent., while the consumption of margarine has gone up by more than 100 per cent.—*Times* Trade Supplement, June 14, 1930, p. 318.

Grape Juice.

By the long storage of grape juice at 0° C., excess of cream of tartar, which otherwise forms a sandy deposit in containers, is removed. It is now explained by Joslyn and Tucker (*Ind. Eng. Chem.*, 1930, p. 614) that by actual freezing at −18° C. much more cream of tartar can be removed than by the usual cooling process. The crystals formed are smaller, easier to wash, more soluble in water and absorb less of the amber colouring matter. Freezing and storage at −18° C. for 24 hours results in the deposition of as much cream of tartar as by storing at 0° C. for two weeks. The freezing method is more applicable to fresh juice high in cream of tartar than for juices with an initial low content owing to the increased solubility on thawing of the crystals formed in this method.

Housewives' Views.

The following remarks made by Olive Bolcum in the course of an address before the National Preservers' Association (U.S.A.) are interesting:

"I had occasion, recently, to interview fifty-four housewives. I found that about half of them had an old-time prejudice that factory made products are of inferior quality due to the use of substitutes for pure ingredients. I found this prejudice had its origin at some time or another in the purchase of some poor quality goods. On the other hand, I found that those housekeepers who did use the factory made product stuck to a brand when they discovered it was uniformly good and they ask for that brand in the stores with which they deal.

"Another thing I have ascertained from my contacts with housewives is that the minute she finds a product off grade, even though it's a favourite brand, she drops it and rarely goes back. Nor is that all. She discusses her misfortune with her neighbours, spreading the word of the inferior grade even more readily than she talks of her favourites."

U.S. Food Colours.

Since the revision, in December, 1927, of the Department of Agriculture's Bulletin No. 1390 (*Chemistry and Analysis of the Permitted Coal-Tar Food Dyes*), three new colours—ponceau SX, sunset yellow FCF, and brilliant blue FCF—have been approved and added to the list of permitted coal-tar food colours. The chemistry and special analytical methods for these three new dyes, as well as a revised method for lead, are treated in Department Bulletin No. 1390 compiled by O. L. Evenson and H. T. Herrick and issued in March of the present year.

Insect Pests.

The U.S. Department of Agriculture has recently issued another important publication (Farmers' Bulletin No. 1483) which deals with the control of insect pests in stored grain. It pays the farmer to harvest his grain crops as soon as possible after they have matured, and to fumigate promptly to kill any stored-grain insects. Fumigation is most satisfactorily and economically conducted in tight cribs or bins, but should not be neglected if these are not at hand. A number of fumigants are available for the control of stored-grain insects. Among these are carbon disulphide and mixtures of which it is the principal active ingredient, the ethylene dichloride-carbon tetrachloride mixture, carbon tetrachloride alone, ethylene oxide, and, under certain restricted conditions, hydrocyanic-acid gas.

This bulletin discusses the characteristics of each of these fumigants, in order to enable one to select the best suited to the particular conditions.

Food and Progress.

If the increase in numbers and size of firms controlling the output of foodstuffs be any indication of the increased prosperity of the people, it is obvious that Canada is forging rapidly ahead. In all directions extensions are being made to existing factories and new ones are being erected. Some typical examples are: The Wooland Dairy, Ltd., of Edmonton, Alta., which is spending $90,000 on alterations and equipment; Eastern Dairies, Ltd., is about to put up a model dairy at Hamilton, Ontario. In the same province, at Harrow, Quality Canners, Ltd., is proposing to spend $50,000 on extensions to their factory, while Wight and Co., the pork packers of Toronto, are extending their works to the tune of $100,000. Moncrieff's Dairy at Peterborough, Ontario, has just been started off with a capital of $50,000, and a chain of thirty-five "candy stores" is to be opened in a few months' time. Federal Bakeries, Ltd., of Toronto, has acquired additional property to the value of $25,000, and in that city a new vinegar factory is being opened, while Richard Hillman Co., the manufacturers of mayonnaise, etc., have taken over 12,000 sq. ft. more space for their work.

Food Examination.

A general account is given by Kuhlein (*Chem. Rund.*, 1929, p. 602) of the application of mercury vapour lamps for the examination of foods. The author refers to the examination of sausage as an example. When sausage is examined by ultra-violet light a fluorescence appears, the sausage cartilage being of a blue colouration, whereas the flesh is red. Other foods which may be tested by means of ultra-violet light are: Milk, meat extracts, butter, margarine, sugar, flour, fruits, etc. The author refers to this means of detecting the presence of margarine in butter and of foreign fats in cacao butter.

Mustard Grinding.

Grinding mustard, like grinding flour, looks simple—but it isn't. In an article which appeared in an American contemporary (*Food Industries*, 1930, March, p. 116) L. V. Burton described the manufacture of prepared mustard in Plochman and Harrison's new factory.

Prepared mustard is a smooth paste made by grinding mustard seed, salt, and spices with dilute vinegar. The pure product does not contain any added mustard bran.

Grinding is the major operation; to this are added other operations, such as pumping, diluting, crushing, mixing, ageing, and various forms of material handling. The middle section of the factory contains the milling room, 32 feet high, which is equipped with a travelling crane. The mills consist essentially of a flat circular stone revolving on a stationary one and are individually motor-driven, using a silent-chain drive. Mustard grinding involves a double, wet-grinding operation.

The vinegar is received in tank cars and is handled by a small bronze motor-driven centrifugal pump and by 1½ inch pipes heavily tinned inside and out. The vinegar is diluted to a standard strength.

Various grades of prepared mustard are developed by blending brown and yellow seeds, together with spices, salt, and vinegar. The seed is first crushed. Making up the batches is based on the weight of crushed seed. Vinegar is measured into the batch mixing tanks and then the other ingredients are added while the mechanical stirrers are in motion. Stirring is continuous to insure that a uniform mixture of spices, crushed seed, salt and vinegar flows into the mills.

From the mills the product is run into barrels or may be pumped into storage tanks.

Fluorides as Refrigerants.

Particulars of manufacture of CCl_2F_2 and general information concerning this and other organic

fluorides which appear to offer possibilities as refrigerating agents were given by Midgley and Henne at the April meeting of the American Chemical Society. It was stated that CCl_2F_2 is less toxic than carbon-dioxide, as non-inflammable as carbon tetra-chloride, and very satisfactory from every other standpoint.

Confectionery in Dutch East Indies.

There are a few factories near Sockaboemi, Java, making hard candies and caramels of low quality which are said to be a small factor in the confectionery trade of the Dutch East Indies. Imports of confectionery from Holland and Germany increased in 1929, compared with 1928, while those from Great Britain, United States, and other sources, showed a decrease. Imports into Java and Madura of confectionery (other than chocolate) from Great Britain fell from 1,418,986 lbs. in 1928 to 1,023,845 lbs. in 1929. On the other hand, the imports from Holland increased from 1,848,663 lbs. in 1928 to 2,086,989 lbs. in 1929; and from Germany they increased from 74,519 lbs. to 175,490 lbs.

In the case of chocolate and chocolate candy the imports showed an increase from all three countries; Holland, 928,185 to 1,025,393 lbs.; Great Britain, 196,158 to 249,250 lbs.; Germany, 8,018 to 22,606 lbs.

Hard candies, caramels, sugar drops, and chocolate bars and drops are most popular in this region. Hard candies in paper from local and foreign sources are sold most widely, due to low price. Chocolates are consumed chiefly by resident foreigners and higher class natives. For the native trade, about 60 per cent. of the hard candies are usually packed in glossed paper within 3½ kilo. (7·7 lbs.) tins. The other 40 per cent. is distributed in 2 kilo. (4·4 lbs.) bottles. For other than native trade, packing in one pound glass bottles for non-chocolate candy is usual. Chocolate drops wrapped in foil are often packed in ½ or 1 pound tall tins, and bars in boxes of ½, 1 or 2 pounds. Box chocolates are usually sold for the Christmas and holiday trade and chocolates in tins throughout the year. Confectionery for this market must be packed in moisture-proof tins to keep in the humid climate.

American candy is said to be too high in price for the native population and is generally sold to the wealthier part of the population.

Candy for the native trade is brought into the Islands by European or Chinese import firms, which sell to the large Chinese dealers, who sell to small dealers, and who in turn sell to retail stores.

Aluminium Utensils.

In view of the extent to which aluminium utensils are now used for the preparation of foodstuffs, it is of great importance to know whether the use of such utensils noticeably increases the amount of aluminium in our food.

This problem has recently been tackled by K. B. Lehmann, who has published in the *Archives für Hygiene* (vol. 102, p. 349) the results of a critical and experimental investigation of aluminium utensils from the standpoint of hygiene. Lehmann has found that the average daily diet contains about 20-25 mg. of aluminium, and this amount is only slightly increased by the use of aluminium utensils in the preparation of the food. Long-continued cooking of acid food in aluminium vessels may increase the aluminium content to 40-60 mg., or even to 100 mg., under extreme conditions. Lehmann, however, considers that in the United States more aluminium is taken into the body through the use of alum baking powders than through the use of aluminium cooking utensils.

The Facts about Xylose.

Widespread publicity has been given recently to an announcement of American chemists regarding improvements in the technic of manufacture that have made possible the large-scale production of xylose, a substance sometimes designated as wood sugar.

In contrast to the familiar six-carbon physiological sugars known as hexoses—a group including dextrose, fructose, galactose, and mannose—xylose belongs in the category of pentoses or so-called five-carbon sugars. The latter rarely appear as such in nature, but are readily formed by hydrolysis of widely occurring pentosans that yield xylose and arabinose.

It is suggested that the lack of fattening propensities of this newly available carbohydrate may serve to give it some popularity in the human dietary. On this account medical attention is drawn to the principal known facts regarding the physiology of the pentoses and of xylose in particular.

The pentoses are apparently readily absorbed from the gastro-enteric canal. The tolerance for them seems variable, and in any event must be designated as low in comparison with other sugars that enjoy a dietary popularity. It is pointed out that xylose can scarcely be classified in the category of readily assimilated sugars; further pentoses appear not to be glycogen formers. It has never been proved that they can replace the physiological sugars as sources of energy or are capable of sparing protein in the body. It is a mistake, therefore, to propagate the view that xylose is properly a substitute for the true nutrient sugars.

Agar.

The General Manager of the American Agar Company, of San Diego, California, has stated (*Food*

Industries, 1930, March, p. 127) that the peculiar properties of agar should recommend it for study to food manufacturers who desire a physiologically inert colloid stabiliser of high gel strength as an adjunct to their products.

Agar is obtained from certain red seaweeds found along the shores of California and Japan. The annual exports from Japan to Europe and U.S.A. are valued at about £500,000. Only one firm in U.S.A. manufactures it direct from the red seaweed. Among the Japanese it is known as *kanten* or *kanteen*.

Tressler in his book on *The Wealth of the Sea* states that agar consists principally of a carbohydrate, gelose, similar in properties to fruit pectin. A sample of American agar with 16·7 per cent. moisture yielded 3·48 per cent. ash.

Agar is insoluble in cold water, but swells and absorbs large quantities of it. When boiled gently for 3 to 5 minutes, it goes into colloidal solution that sets to a firm jelly when cooled. The set occurs at much higher temperatures than do gelatin solutions of the same concentration.

American agar is claimed to be tasteless and odourless and much of the prejudice against its use has been due mainly to the marine taste and odour of inferior qualities.

Uses of Agar.

In Mr. MacKinnon's article, referred to above, it is stated that the desirable quality of agar in food manufacture is that it jells readily and at relatively high temperatures without the assistance of any intermediate substance. On account of its high jell strength it proves very economical.

Experiments indicate that the use of agar in breads and pastries keeps them fresh longer. Also, a jelly candy can be made with less sugar than usual by using agar in a ¾ to 1 per cent. solution. In the preparation of malted drinks it acts as a stabiliser—especially in chocolate drinks and syrups it prevents the formation of sediment. In the manufacture of ginger ale and fruit drinks it has been claimed to improve and sharpen the flavour.

Dahlberg (Bull. 536, New York State Exp. Sta., —"*A Study of the Manufacture of Water Ices and Sherbets*," 1926) found that agar in water ices made them smooth, not crumbly, and prevented the drainage of unfrozen syrup out of water ices in the hardening room. Dahlberg has also studied the favourable effects of using agar as an ingredient in ice-cream and in the Neufchatel type of cream cheese. Finally, it is claimed that agar has been highly recommended by manufacturers of mayonnaise.

Food and Baldness.

A deficiency of vitamin G, the latest addition to the dietary alphabet discovered by Professor Sherman of Columbia University, is held to be the cause of baldness. Although "G" was only identified a year ago, according to *Scientific American* (July, 1930, p. 61), many elaborate experiments on its value in diet have been conducted. It is looked upon as the vitamin of growth, and in experiments on rats, it was seen that a deprivation resulted in premature senility and loss of hair. It is also believed that a shortage may be the cause of pellagra, a disease fortunately not known in this country, though prevalent in many others. Hitherto the cause of pellagra has been unknown, though it was thought to arise from parasitic infection, such as the bite of a fly, and was especially prevalent among people dwelling along the banks of streams. Vitamin G is found abundantly in milk, spinach, kale, and cabbage, and rather less so in meat and eggs.

Factory Air Conditioning.

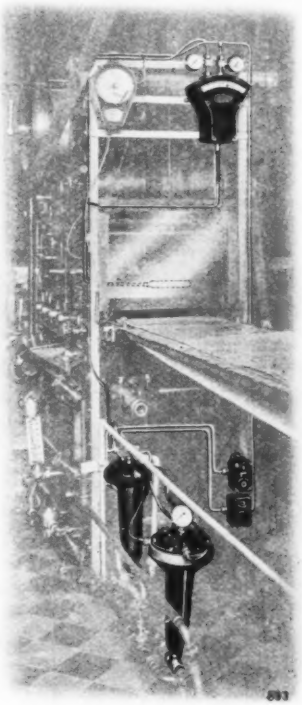
Under the title of "Manufactured Weather" D. C. Lindsay, in *Industrial and Engineering Chemistry*, deals with the conditioning of air in factories, and in view of the importance of this subject, one has no hesitation in commenting upon this matter. The science of air conditioning has grown from the simple fan for air circulation and certain types of temperature control plant to highly technical humidifiers. The early work of Carrier in 1902 established the fact that the most satisfactory method of cooling and dehumidifying air was to subject it to a finely atomised spray of water previously cooled to a definite temperature. This process was at once taken up by several American textile firms, who were greatly in need of such a process on account of the influence of varying humidity of the atmosphere on delicate textile fibres.

The proper conditioning of air is most important in many food manufacturing plants, and an example is quoted of the use of air conditioners in flour mills. The functions of such a plant in this instance are to cleanse the air coming into contact with the material being handled, and to maintain a constant moisture content in the finished flour. By this means, the miller suffers no loss from subsequent evaporation. Another example is the Postum Cereal Company's works, where careful atmospheric control is maintained during the whole of the handling of this weather sensitive product. Apart from being an essential factor in turning out high grade, clean and uniform materials, the fact must not be overlooked that a carefully controlled atmospheric condition in a food factory is a great asset to the comfort of the workers. Such physical comfort during the working day lessens fatigue and so directly helps towards increased production, to say nothing of a staff of contented workers.

The Automatic Conditioning and Temperature Control of Chocolate in an "Enrober"

By J. VALENTINE BACKES, A.R.C.Sc., A.I.C.

First, the conditions necessary for successful enrobing are discussed. This is followed by a description of a new invention, by means of which not only the temperature of the chocolate immediately prior to its deposition on the goods can be controlled, but also the particular physical condition best adapted for covering can be maintained. It is claimed that results equal to hand-covering are obtained.



"Enrober" equipped with Drayton-Backes Regulator.

THE COVERING of chocolates by the enrober machine, although good, has never as yet equalled that done by hand-dipping. Moreover, the enrober machine, although mechanical, requires constant skilled attention if the best results are to be obtained. Besides the control of temperature (which is in itself difficult to maintain constant, by hand manipulation of the water and steam) there is the far more important requirement of conditioning the chocolate. Attempts have been made to carry out these operations automatically, but the lack of success has been due to the fact that they have been considered as separate items instead of being treated as one problem. On the one hand, automatic temperature control has been applied and the points necessary for the conditioning of the chocolate lost sight of in attempting to keep the pen of the recording thermometer at one set temperature. Likewise the conditioning of the chocolate was attempted, but owing to fluctuating temperatures the process did not prove continuous.

By combining these two problems, however, there has recently been developed an equipment which not only constantly and accurately controls the temperature of the chocolate at its vital stage of covering—namely, as it is about to flow on to the goods—but automatically renders the bulk mass of chocolate in that condition most ideal for covering. This equipment is known as "The Drayton-Backes Automatic Regulator."

Before describing this equipment, a word on the conditioning of chocolate and the temperature regulation of enrobing machines is necessary.

Hand-Dipping.

The superiority of the "finish" and gloss obtained by hand-dipping as compared with enrober covering is due to the constant intermixing of cool with warm chocolate. The actual chocolate put on to a "centre" in hand-dipping is a definite mixture of two chocolates at different temperatures, so balanced as to give a chocolate at the right degree for covering. The hand-dipper working, as she does, with a relatively small mass of chocolate is able to keep the temperature within the required limits. The chocolate on the outer rim of her plaque slowly cools, and this cooled portion is being constantly stirred into the bulk. Initially she mixes in the cool chocolate to temper down the warmer, but it is known that by so doing a greater object is unconsciously attained. It was noticed that the gloss obtained on hand-covered goods was more permanent and much superior to that obtained by machinery. Research has shown that this superior gloss and freedom from bloom is essentially due to the manipulation which the chocolate undergoes in the hand-dipping process.

The mixing of a portion of cooled chocolate and a portion of warm has the effect of producing conditions which enable more even and rapid setting of the cocoa butter. Thus, to produce results on an enrober equal to the hand-dipper, it is essential to reproduce these conditions.

Temperature Control.

The second factor essential in enrober covering is the control of temperature.

Many automatic temperature regulators are on the market, but fewer are actually in use; for, while they may be excellent temperature controllers, their application to the chocolate enrober has not been studied from the chocolate manufacturers' viewpoint.

With few exceptions the basis of these controls is the maintenance of the temperature of the water-jacket surrounding the main bulk of chocolate in the tank of the enrober. It is essentially an indirect control of the temperature of the chocolate, but, while it may keep the *water-jacket* at a constant and regular temperature, there is no assurance that the *chocolate* is similarly controlled within these limits. The main objections to this type of control are:

(*a*) The temperature difference between the controlled water-jacket and the chocolate is too small to counteract variations in the chocolate due to heat gains or losses.

The main bulk of chocolate in the tank is subject to heat gains or losses from sources other than the water-jacket surrounding it. The excess chocolate running off the "centres" will be cooler, while that returning from the drip extension plates will be warmer. And these do not necessarily balance. Again, all enrobers are not ideally housed in air-conditioned rooms, and in consequence heat losses from draughts may be experienced.

(*b*) The fact that the water-jacket is accurately and constantly maintained at a constant temperature within half a degree is no guarantee that the chocolate in the trough at the *top* of the machine is similarly controlled within these limits. Yet the chocolate, as it is about to fall on to the goods, is at its critical stage of covering—at the stage where temperature becomes a vital factor.

The question of time lag must be studied, and any control to be successful must be capable of overcoming difficulties between transference of temperature from the bulk mass at the base of the machine to the curtain of chocolate at the top of the machine.

(*c*) By maintaining the water-jacket at one fixed temperature, and thus holding the whole mass of chocolate at a temperature round about the melting-point of cocoa butter, the chocolate tends to thicken. This thickening is also accompanied by a rise in temperature due to heat of crystallisation. Thus, conditions are brought about which seem a paradox to chocolate—thicker yet warmer.

When such a condition develops, the chocolate slowly becomes too thick to work efficiently, with the result that either hot chocolate must be fed into the bulk tank or else the mass must be heated up to melt the solid fractions of fat and cooled down again to working temperature—a process necessitating time and labour, and far from automatic!

(*d*) By attempting to maintain the bulk mass of chocolate at one constant temperature, the chocolate lacks that manipulation and conditioning essential for superior gloss and freedom from bloom.

The chocolate in an enrober so controlled is a mass at one uniform temperature throughout, instead of a balanced mixture of cool and warm chocolate. Each particle is more or less at the same temperature—whereas, for ideal covering, it is essential to have a mixture of cooler particles intermixed with warmer. It is the presence of the cooler particles that induces the chocolate to set off more rapidly and evenly, and in so doing to produce the permanent gloss.

(*e*) True temperature regulation of chocolate in an enrober can only be said to be done when the element, or bulb, operating the controls, is worked directly by the film of chocolate falling on to the goods.

The chocolate as it flows on to the goods is at its vital stage of covering, and it is at this stage that control is essential, and any variation rapidly and automatically rectified.

On the other hand, by inserting the regular bulb in the water-jacket, the regulator first stabilises the temperature of the water. The water then stabilises the temperature of the main bulk of chocolate in the supply tank, which in turn is conveyed to the top of the enrobing machine. The time lag is very great and cannot be considered as direct control.

The Drayton-Backes Automatic Regulator.

In developing this new regulator and conditioner, the numerous factors have been studied, the main features being to control automatically the temperature of the chocolate at its vital stage of covering—namely, as it falls on to the goods—and at the same time to manipulate and condition the main bulk of chocolate in the bulk tank so as to render it a balanced mixture of cool and warm chocolate—the replica of the hand-dipping process.

It is absolutely automatic, and the enrober once charged with chocolate will run continuously with an absolute minimum of attention. It is adaptable to any type of enrober fitted with water and steam.

The Equipment.

The equipment consists essentially of three regulators all synchronised and working in unison. The bulb of the main control—the dial set regulator—is inserted at the top of the enrober in the curtain of chocolate actually flowing on to the goods being covered. This control governs the temperature of the chocolate at this stage to within half a degree either side of the desired temperature to which the regulator is set.

There are two subsidiary controls which are inserted in the water-jacket of the bulk tank. These are the high limit and low limit thermostats and work in unison with the main regulator. These three regulators are coupled up in the circuit to special direct and reverse acting valves in the steam and water line supplying the water-jacket of the enrober.

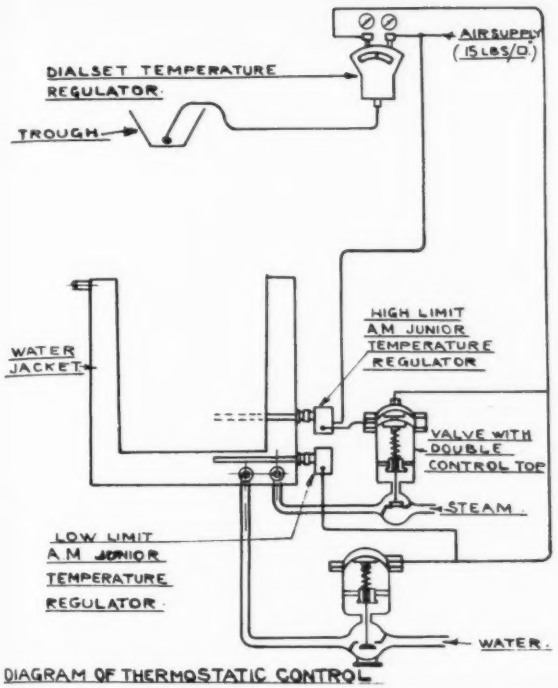


DIAGRAM OF THERMOSTATIC CONTROL EQUIPMENT FOR CHOCOLATE ENROBER MACHINES.

T.2878.

The line drawing T.2878 gives the diagrammatic layout of the Drayton-Backes Controller.

The bulb of the dial set regulator (the temperature control unit) is inserted in the "curtain" of chocolate from the trough at the top of the enrober, while the high and low limit temperature regulators (the conditioning and check units) are shown in the water-jacket surrounding the bulk tank at the base of the machine.

Compressed air at 15 lbs. per square inch fills the system, and by the automatic opening and closing of leak ports on the regulators (brought about by temperature variation) the compressed air is diverted into the valves on the water and steam lines, causing them to open or close and so control supply of water and steam to the jacket.

Each regulator performs a specific function, but the whole system is so synchronised as to produce the required set of conditions automatically with elimination of time lag.

The whole is worked by compressed air of about 15 lbs. pressure.

The Principle of Working.

The main "dial set" regulator does the duty of controlling the temperature of the chocolate. Being inserted in the actual stream of chocolate flowing on to the goods, it directly controls the temperature of the chocolate, where control is essential. Thus all difficulties due to time lag and possibilities of heat gains or losses are eliminated.

The high and low limit thermostats are responsible for the *conditioning* of the chocolate in the bulk tank. Working in unison with the main regulator, they prevent super-heating or cooling and produce a balanced mixture of cool and warm chocolate at the temperature set by the main regulator. They are inserted in the water-jacket surrounding the bulk of chocolate in the base of the machine. They so operate that the temperature of the water-jacket is made to fluctuate constantly between predetermined maximum and minimum limits. It is the automatic operation of these two thermostats which conditions the chocolate by continuously cooling and warming, and so renders it a balanced mixture of cool and warm chocolate, instead of maintaining it as a mass at one uniform temperature. Moreover, they act as a safeguard against overheating or cooling, which, owing to the viscosity, etc., of the chocolate, is so often likely to happen.

Mode of Operation.

The enrober is started up with a full charge of chocolate round about the desired temperature for covering, and the chocolate flows over the bulb of the dial set regulator prior to its falling on to the goods. Immediately the temperature of the chocolate at this stage varies, the regulator comes into operation. Should the temperature start to fall, the water valve operates and the supply to the tank is cut off; simultaneously the steam is turned on. Thus heat is applied to the water-jacket of the bulk chocolate tank, until the temperature of the water is raised to the set temperature of the "high limit" thermostat. As soon as this temperature is reached, the "high limit" thermostat comes into operation and shuts off the steam.

The point to be noted here is that the steam is not left to play on the water-jacket until the temperature of the chocolate in the *top* curtain starts to rise, for the time lag is so great that the bulk of chocolate would soon become overheated before any perceptible rise of temperature was effective in the curtain of chocolate in the upper part of the machine.

The amount of heat which is allowed to be transmitted to the water-jacket is thus controlled by the "high limit" thermostat, which, being adjustable, can be set to the desired degree according to the conditions of working. It thus prevents overheating and makes the necessary allowances for time lag in transmission of heat from the bulk tank to the covering curtain of chocolate.

By this automatic application of gradual heat, the fall of temperature in the covering curtain of chocolate is arrested and in turn is made to slowly rise. Immediately it rises a fraction above the desired covering temperature, the main regulator comes into operation again and opens the water valve until the water in the jacket is cooled down to the tempera-

ture of the low limit thermostat. As soon as this temperature is reached, the water supply is automatically cut off and the steam is momentarily turned on. The steam and water are then intermittently turned off and on so as to maintain the temperature of the water-jacket at the temperature to which the low limit thermostat has been set.

The temperature of the water-jacket now being below the melting-point of the chocolate tends to chill the chocolate on the sides of the bulk tank. This chilled chocolate is scraped off and mixed into the bulk by the stirrers of the enrober. Thus a portion of cool chocolate is being mixed into the bulk, and will continue to be mixed until the whole becomes a balanced mixture of cool and warm chocolate at the temperature set by the main regulator—a replica of the hand-covering process but *automatically controlled*.

This mixing of the cool chocolate will continue to take place until the temperature of the chocolate in the covering curtain starts to fall. A slight portion more, however, is cooled than is necessary to bring the temperature back to normal, with the result that the curtain temperature falls just below the desired temperature—thereby bringing into operation the main regulator and repeating the process described above.

The regulator thus produces a continuous fluctuation between predetermined maximum and minimum limits in the main bulk of the chocolate, while the temperature at the vital stage of covering is being

Time.	*Temperature of Chocolate in "Curtain."*	*Temperature of Water-Jacket.*	*Water.*	*Steam.*
	° F.	° F.		
10·0	90	86	on	off
10·1		84	off	on
10·2		86	on	off
10·3		84	off	on
10·4	∨	86	on	off
10·5	89·75	90	off	on
10·6		92	off	on
10·7		94	off	on
10·8	∨	96	off	on
10·9	89·9	96	off	off
10·10		95	off	off
10·11		94	off	on
10·12		96	off	off
10·13		95	off	off
10·14	∨	95	off	off
10·15	90	94	off	off
10·16		93	off	on
10·17		95	on	off
10·18	∨	91	on	off
10·19	90·2	87	on	off
10·20	90·2	84	off	on
10·21	90·2	86	on	off
10·22		84	off	on
10·23		86	on	off
10·24	∨	84	off	on
10·25	90·1	86	on	off
10·26		84	off	on
10·27		86	on	off
10·28		83	off	on
10·29		85	on	off
10·30	∨	84	off	on
	90			

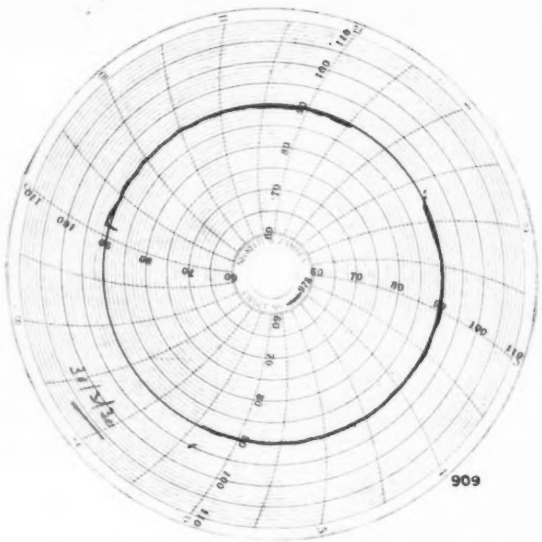


Chart showing Temperature of Chocolate at Time of Covering.

maintained within half a degree of the desired temperature for covering. In a word, cool and warm chocolate is being continuously intermixed to give a balanced mixture at one desired temperature; the hand-covering process is automatically produced on a mechanical enrober with the accuracy and precision impossible by hand-control.

To give some idea of the sensitivity and rapidity of action of this regulator, a table is given showing actual time and fluctuation of temperature of the tank and the chocolate.

The temperature of the chocolate when shown on the chart of the recording thermometer gives a slightly wavy line above and below the desired temperature of working. The complete cycle of attaining its maximum and minimum temperatures takes place about once every thirty minutes.

The Advantages of the Drayton-Backes Regulator.

1. It automatically controls the temperature of the chocolate at its critical stage of covering—namely, as it is about to flow on to the goods.

2. It automatically renders the bulk of chocolate in the ideal condition for covering.

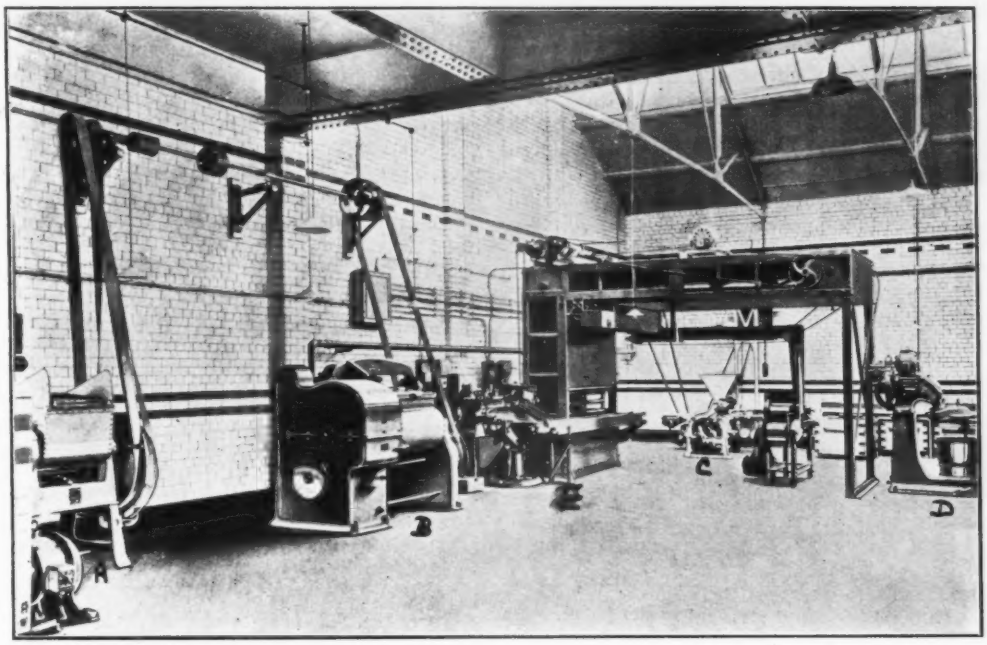
3. It prevents undue thickening of the chocolate, so that the enrober can be run continuously without periodic stopping to recondition the chocolate.

4. It improves permanent gloss and lessens liability to bloom.

5. It saves labour by eliminating that skilled attention required for hand-control.

6. It saves refrigeration, for by conditioning the chocolate it sets more rapidly and evenly.

7. It can be fitted to any enrober where the jacket surrounding the bulk tank is operated by steam and water.



Modern Bakery for Flour Confectionery, showing, A, Universal, and, B, Baker-Perkins Cakemaking Machines; C, Baker-Copland Depositor; D, Nuovamixer Whisking Machine; E, Automatic Plant for Tea Cakes, Buns, etc.

Modern Cakemaking Processes

By EDMUND B. BENNION, M.Sc.Tech., A.I.C.
Head of National Bakery School, London.
Author of "CAKE MANUFACTURE AND SMALL GOODS PRODUCTION."

The following article surveys recent developments and present tendencies in cakemaking processes. The subject is treated in great detail by the author in his new book on "CAKE MANUFACTURE AND SMALL GOODS PRODUCTION," *which will be read with intense interest by everyone in the trade. This book breaks entirely new ground and will prove to be one of the principal factors promoting the rapid progress of the industry.*

MANY INDUSTRIES which have developed from trades in which craftsmanship played an important part have adapted the old methods to the modern methods of production.

In the days when many small bakery businesses were owned by individual craftsmen, the recipe book was an all important factor, and for the operative himself the recipe book he carried was, in the majority of cases, his only credentials.

The history of a craftsman's recipe book would afford interesting reading. One thing is certain, and that is that recipes have been formulated as the result of many experiments. When such work is carried out to-day and the results are formulated, then the matter becomes research. The origin of any particular method must surely have been due to an effort to arrive at the easiest possible way of incorporating the various ingredients so as to produce an intimate mixture which when baked would be pleasing to eat. The ingredients which are used in the compounding of a cake are by no means easy to distribute one with the other, and although emulsification was an unknown process in those days, yet it must have been realised how necessary was the intimate mixing of the components in order that the cake produced would have good keeping qualities and, especially, excellent eating qualities. These could only result when the cake broke down easily on the palate and showed every tendency to dissolve in the mouth, requiring only the minimum amount of mastication.

Established Methods.

Possibly, for these reasons, the process known as the "*sugar batter*" *system* was evolved. In this method the sugar and butter are creamed up so that a partially aerated dispersion of sugar, water, and fat results. Then the eggs are incorporated a little at a time in order that an oil-in-water emulsion can be

obtained, the lecithin of the egg yolk most probably acting as the stabilising agent in the production of the emulsion.

Finally, the flour and fruits are added with sufficient mixing to bring about an even distribution of these ingredients, but insufficient to bring about any toughening of the batter, because of the development of the gluten of the flour to too great an extent for a cake batter.

By this procedure a good mellow eating cake should result from a correctly balanced recipe.

About 50 years ago another method of cake production was introduced and the "secret" could then be obtained if a suitable price was paid. This was done in many cases, whilst a few itinerant craftsmen carried the method from place to place and sold it for a lower fee as necessity demanded. This was a method which aimed at producing cakes with a regular textured crumb and concentrated on general appearance rather than eating qualities; this appears to be based on the idea fundamental to modern salesmanship that it is the appearance of a commodity which is of primary importance in acting as a sales force.

This method was known as the "*flour batter*" *system*, and the underlying principle is to break down the coherence of the gluten by bringing about a mechanical hindrance in some of the flour and preventing the formation of tough glutenous threads; on the other hand, the glutenous threads are rendered elastic and thus capable of producing a fine network inside the cake.

The method is very successful in performing this operation, but unfortunately the mellowness of crumb is not obtained to the same extent as with the sugar batter system, and whilst appearances may be improved, the crumb does not break down on the palate in the same way. More mastication and greater deglutition are required before it is ready for absorption by the system, but this may be more apparent to the expert than the lay palate.

This method has been very widely developed in the production of the many varieties of slab cakes that are now obtainable. Modifications have been in the direction of replacing the eggs, which not only supply moisture to the batter and cake but also provide the aeration through the incorporation of air in the albumen and the expansion of this air in the oven. In order to do this milk has been substituted as the moistening agent and baking powder as the aerating agent.

The colloidal complex of the matter is rather different than when eggs alone are employed, and especially is this the case when considering the staling of the cake and the rate of staleness. Research is now being carried out on the use of emulsions as the moistening agent, whilst lecithin products are also being experimented with in an attempt to retard staleness by utilising the properties of a protective colloid possessed by lecithin as well as the great food value it is known to possess.

New Cakemaking Method.

These methods have held the field generally for many years, but this year another method has been published in an American scientific paper which was not unknown to some craftsmen, but had never before been published or investigated in a scientific manner. This method is particularly suitable for adoption when mechanical mixing is to be employed solely, and with this method the butter, vegetable fat, or lard, sugar, flour, cornflour, milk powder, salt, and baking powder were all mixed together in the machine bowl. The proportion of dry ingredients to fats is such that it is impossible to cream them all together in the ordinary manner, but instead they are intimately mixed so that they are rubbed together in a manner similar to that used for a shortbread paste. The egg yolks and whole eggs are mixed together in such a way that they can then be mixed in with the dry ingredients, producing a smooth soft batter. The cakes produced by this method were excellent in every respect and a slight modification of the process produced even more satisfactory results.

The action of mixing in all the flour by machine is contrary to all established practice, but the results obtained were sufficient justification for the change. This new method shows that, whilst the old methods —which have been handed down from generation to generation—have produced good results when correctly worked, there is no reason why in the light of development of emulsification and a greater knowledge of all the raw materials available for the baker some new method should not be evolved which will produce better cake of more uniform quality.

As far as this method is concerned, the quantity of sugar used was 20 per cent. more than would have been used in the flour-batter method using similar sized mixing, whilst the quantity of baking powder was 25 per cent. greater. These two are the most important factors because of the solvent action of the sugar on the gluten of flour and the extra aeration provided by the extra baking powder necessitated by the mechanical working of the batter. Fruit cakes can be made by this method, mixing in the fruit with the dry ingredient, but it was found necessary to reduce the baking powder to normal quantities, otherwise the cake was too light to hold the fruit in an evenly distributed manner.

With the large scale production of cakes, more attention has had to be paid to the raw materials than ever before, whilst details of manufacture have been so studied that new types of methods have been evolved which unfortunately are not published because they are "secret." Unfortunately it is a necessity of competition that such secrets must be safely guarded, but these very frequently relate more to details of technique than to quantities and method.

Just as in biscuit manufacture the blend of flour must be closely studied, so in cake production the pitch of flour is of paramount importance and must always be of a certain strength. Fats must be selected which are capable of producing the most stable of emulsions, and for this purpose fat blending plants are installed so that a regular product under the control of the chemist is ensured. All the mixing operations are timed—a most essential factor of control—whilst the temperature of the batters

(*Continued on page 258.*)

Scientific Control of Grinding in the Chocolate Industry

By A. G. AVENT, A.I.C., CHIEF CHEMIST, AND R. H. MORGAN, B.Sc., A.I.C., MANAGER, *Messrs. A. J. Caley and Son, Ltd., Norwich.*

Without some systematic control the production of chocolate of a really standard fineness is almost impossible. The authors describe a method of microscopic examination which they have developed and applied to the control of grinding operations. The information contained in this paper is of great value to the chocolate industry generally.

FINE GRINDING is probably as essential a feature in chocolate making as the quality of the raw materials; for no matter how delicate the blend may be, if the particles are coarse the full flavour will not be apparent.

For many years now European manufacturers have endeavoured to produce impalpably fine chocolate, for both couvertures and bars. High fat content helps to bring about this smooth effect. Fine grinding will give the same smoothness with less fat, which is contrary to the idea that more fat is required on account of the further subdivision of the particles giving a greater surface area of dry material. Since the recent introduction of lecithin as a fluidity control, a saving of 15 to 18 per cent. of the total fat may be effected. In this case it is obvious that to ensure a sensation of smoothness to the taste very fine grinding is necessary to make up for the reduction of the butter.

The various machines used in the early stages of chocolate manufacture are essentially grinding machines. To begin with, the roasted nibs must be reduced to a certain degree of fineness, and for the purpose double and triple stone mills were usually employed. Nowadays these have been superseded by roll grinders. The nibs are passed through the pair of top rollers and reduced to a pasty mass, which becomes more fluid and of extreme fineness in its passages through the second and third pairs of rollers. Other types of cacao grinding machines are fed from the bottom pairs of rollers, in a similar manner to the ordinary chocolate refiner. Although it is essential that the mass should be ground as finely as possible at this stage, manufacturers rely more on the five-roll refiners used later in the process.

Sugar.

The granulated sugar is disintegrated by means of one of the many efficient machines available, and sieved through bolting silk, or alternatively air-separated. The degree of fineness, apart from microscopic examination, can be determined by taking 10 grams of the "icing sugar" and gently rubbing through a small sieve of No. 20 silk (mesh aperture 1/325th inch) and weighing the residue. A good icing sugar will leave about 3½ per cent. of sugar with crystals larger than 1/325th inch diameter.

The Melangeur.

Following the usual procedure in the manufacture of chocolate, it is found that the melangeur plays little part in diminishing the size of the particles composing the chocolate mixture. With the discharging of this machine to the 3-roll crusher begins the first grinding of the mixture.

The Refiner.

It is in the next stage that the real refining of chocolate takes place. A refiner consists usually of five rollers revolving at different speeds. These rollers are perfectly machined, steel, water-cooled cylinders, and, owing to the engineering skill in their manufacture, exert an even pressure throughout their whole length.

The chocolate is fed in between the bottom pair of rollers. The thin film of chocolate which forms is carried up the series by the increasing speeds of the individual steel rollers. The adjustment of these grinding rolls is necessarily an important feature, since the fineness of the chocolate depends entirely on the correct spacing of the rolls and on vibration control. The increasing speeds of the rollers, in addition to the lifting of the chocolate, in the form of a film, exerts a tearing action brought about by difference in speed of the grinding surfaces. This is in addition to the crushing or grinding effect.

It is only possible to examine the efficiency of a refiner by actual measurements of the individual particles. Measurements by means of a microscope give more comprehensive results than an attempt to gauge fineness by tasting.

When testing the efficiency of any one refiner, chocolate is passed through straight from the 3-roll crusher. To ensure absolute fineness of the final product the various machines are followed through and measurements are made of their individual grinding actions.

Sampling.

It is most important that a representative sample should be taken of the product passing through the refiner. To sample, arrangements are made to have the 5-roll refiner running under normal conditions. The cut-off plate is pushed in, and at the same time a stop-watch is started. A tared tin is placed under the outlet and the cut-off plate is opened. The

chocolate runs into the tin, and after a period of three minutes the cut-off plate is again pushed in. From the weight of chocolate the production is noted in pounds per hour. A careful sample is then taken of the weighed chocolate, made up of small quantities from different parts. A total weight of about half a pound should be sufficient.

The Microscope.

The next step takes place in the laboratory. A microscope having the following attachments is necessary—a No. 2 micrometer eyepiece (power × 6), 2/3rds and 1/6 inch objectives, a mechanical stage, an eyepiece micrometer, and a stage micrometer.

The eyepiece micrometer is ruled with scale, 1 cm. divided into 100 parts, and numbered 0, 10, 20, 30, etc.

The stage micrometer consists of a glass slide on which a circular disc of glass is mounted with lines ruled 1 mm. apart. This distance is divided by etched lines into 10 parts and one of these further subdivided into another 10 parts giving divisions of 1/10th and 1/100th mm.

In order to determine the magnification factor, the microscope is fitted up with the eyepiece containing the micrometer and the stage micrometer attached to the mechanical stage; then, using the 1/6th inch objective, the number of divisions of the eyepiece micrometer, which just coincide with the 1/100th mm. on the stage micrometer, is read off. With the authors' microscope 38 divisions in the eyepiece corresponded with 1/100th mm.—*i.e.*, 38 divisions are equivalent to 1/100th mm. or 10 microns. (1 micron = 0·001 mm. or 0·000,039 inch.)

The magnification factor in this case is 100/38. Therefore the number of divisions in the eyepiece which coincide with the particle to be measured when multiplied by 100/38 will give the magnitude in microns.

Microscopic Examination.

The largest pieces of cacao and sugar are the more important, because grittiness becomes apparent with quite a small proportion of coarse particles. For this reason a measurement of the largest particles of cacao and the largest crystals of sugar is made.

The sample is carefully averaged, and a microscope slide is made up using clove oil as a medium for the even distribution of the chocolate.

The microscope field is first viewed through 2/3rd inch objective (magnification × 80) and a complete search is made for the largest cacao particles by means of the mechanical stage. The procedure adopted is to pick out, say, the ten largest particles and then bring into action the 1/6th inch objective (magnification × 300) and measure by means of the eyepiece micrometer the diameter of the ten pieces of cacao. It requires some practice to avoid measuring the same piece more than once.

The sugar particles are then subjected to a similar system of measurements—*i.e.*, ten of largest crystals are isolated with the 2/3rds inch objective and measured by means of the 1/6th inch objective.

In addition, the crystals of sugar which are representative of the greater proportion are measured, thus giving the average size of the sugar.

This is more easily understood when it is remembered that the first two sets of measurements were concerned with the average largest particles and not with the real average.

The measurements are then averaged, and the range taken, maximum and minimum, of the ten particles in question. To convert the divisions of the eyepiece into microns, the number of divisions representing the diameter of the particle is multiplied by the magnification factor as described above. As an illustration, the following results were obtained from an examination of plain chocolate bar containing 33·6 per cent. of fat.

Fineness of Grinding.—Average size of largest cacao particles, 70 microns; range, 50-130 microns. Average size of largest sugar particles, 50 microns; range, 40-60 microns. The greater proportion of sugar particles, 19 microns in diameter.

This is an example of very efficient grinding. The grinding effect of individual 5-roll refiners is given below. In each case the chocolate is direct from the 3-roll crusher.

Plain Couverture.—Production speed, 320 lbs. per hour. Average size of largest cacao particles, 80 microns; range, 55-100 microns. Average size of largest sugar particles, 60 microns; range, 55-80 microns. The greater proportion of sugar particles, 27 microns in diameter.

For one refining, an excellent result.

Milk Chocolate.—Production speed, 720 lbs. per hour. Average size of largest cacao particles, 90 microns; range, 55-120 microns. Average size of largest sugar particles, 75 microns; range, 55-95 microns. The greater proportion of the sugar particles, 32 microns in diameter.

For one refining, result good.

Milk Chocolate.—Production speed, 810 lbs. per hour. Average size of largest cacao particles, 115 microns; range, 60-215 microns. Average size of largest sugar particles, 100 microns; range, 65-135 microns. The greater proportion of sugar particles, 40 microns in diameter.

Refining, definitely poor.

Value of the Results.

Results such as are given in the above reports are of great value to the industry generally. For instance, these reports enable superintendents to keep a check on the various refiners. For general control the 5-roll refiners can be constantly tested. Perfect adjustment of individual rollers can be brought about by taking samples from the right hand, the centre, and the left hand of the roller, and the measurements indicate where the pressure is required.

The purchaser of couvertures will find in the above method a means of examining the fineness of the chocolate supplied.

The efficiency of new types of grinding and refining machines can be readily assessed, since the value depends upon the ultimate size of the particles produced.

The Complete Cycle in Chocolate Manufacture.

Without some systematic control, such as the microscopic examination described, the production of chocolate of a really standard fineness is almost impossible.

Considering the usual procedure, cacao mills, disintegrators for making "icing sugar" followed by melangeurs, 3-roll crushers, 5-roll refiners, kneaders, and conches, systematic measurements of the constituent particles at the various stages can be made. The diminution in the size of the particles is readily noted, and the grinding efficiency of the various machines is kept under control, and adjustments made accordingly.

In order to illustrate the above processes, the following measurements may be of interest. These were taken during actual manufacture.

Milk Chocolate.

Melangeur.—To supplement the microscope, sieving tests were made, using No. 20 silk sieve (mesh aperture 1/325th inch); No. 13 silk sieve (mesh aperture 1/215th inch); No. 4 silk sieve (mesh aperture 1/80th inch).

Sieving test No. 20: Residue, 23 per cent. No. 13: Residue, 13 per cent. No. 4: Residue, 0·6 per cent.; fat content, 21 per cent.; mass temperature, 37° C.

Sugar, average largest particles, 250 microns.

These measurements indicate that a slight reduction in size of particles starts at this stage.

5-Roll Crusher.—Sieving test No. 20: Residue, 4 per cent.; mass temperature, 37° C.

Sugar, average largest particles, 90 microns.

The crusher used is much more effective than the usual 3-roll crusher.

5-Roll Refiner.—Sieving test No. 20: Residue, 0·3 per cent.; mass temperature, 27° C.

Cacao, average largest particles, 95 microns. Sugar, average largest particles, 60 microns.

Although only once through, quite good refining.

Kneader.—Sieving test No. 20: Residue, 0·3 per cent.; mass temperature 35° C.

Sugar, average largest particles, 60 microns.

No change.

Conche.—Sieving test No. 20: Residue, 0·3 per cent.; mass temperature, 60° C.

Sugar, average largest particles, 60 microns. No change in actual size of sugar particles. Further, the microscope gave no definite evidence of any rounding of the particles, as is often stated to be brought about by conching.

Use in Cocoa Manufacture.

The above sieving tests and microscopic measurements can be applied to cocoa powder production.

Sieving tests carried out on four leading English proprietary cocoas gave the following residues:

	Fat.	*Residue Retained on Sieve.*		
		No. 4.	*No. 13.*	*No. 20.*
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
A.	25·1	0·4	3·7	12·6
B.	25·7	0·2	3·1	16·0
C.	24·5	0·5	6·0	16·6
D.	23·3	0·03	21·1	28·9

Measurements of Fondant-Cream Crystals.

When a smooth cream is required it is essential that the temperature of the syrup entering the beaters should be such that the smallest sugar crystals are formed. Further, the shape of the crystals is important, since a small sharp-edged crystal will feel as rough, or probably rougher to the tongue, than a larger rounded crystal.

The examination of the various shapes and sizes as shown by the microscopic method is a valuable aid in correcting any fault in cream making.

A sample of cream from an automatic cream plant (cooling drum system) gave for the size of the average largest sugar crystal 20 microns, the size of the greater proportion of the sugar crystals 8 microns. Another batch from the same plant gave 15 microns for the largest crystals, and 5 microns for the greater proportion.

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Articles for Next Issue

The October issue will be vitally important to canners. A well-known American expert gives full details of Developments in Food Processing Machinery, *profusely illustrated by photos of plant and equipment.*

Another article is by a British authority, and discusses important matters of Heat Penetration *applied to British practice.*

Other special features deal with Processing Times and Temperatures *and with* The Present Position of English Canning.

CANNING EXHIBITION, LEICESTER

October 24 to November 1

FOOD MANUFACTURE

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STAND J. 89

Where the Editor and Publishers will welcome all interested in Canning and the Food Industries.

Recipes

By J. Boyd.

Candies and Caramels

Vanilla Cream Candy.

1 qt. table cream
2 lbs. sugar
6 ozs. glucose
12 ozs. fondant.
8 ozs. fresh butter.
Essence of Vanilla

Boil cream, sugar, and glucose to 245° F., stirring to prevent burning, then add the butter in small pieces, bring the "boil" to 250° F., remove from fire, add the vanilla and stir in the fondant; continue stirring till the contents of copper become opaque and show signs of setting.

Pour on prepared, oiled slab, having "setters" in position.

Mark into sections when partially set.

NOTE.—This candy makes a very suitable centre for chocolates that are sold at a good price.

By omitting the vanilla essence and adding suitable colours and essences, the following varieties may be made from the recipe as given above.

Orange, colour and essence of orange.
Lemon, colour and essence of lemon.
Raspberry, colour and essence of raspberry.
Strawberry, colour and essence of strawberry.
Coffee, essence of coffee.

For chocolate candy, add or, rather, take—

2 lbs. sugar
1 qt. table cream
8 ozs. fondant
8 ozs. glucose
½ oz. unsweetened block chocolate (melted).

Might I emphasise the fact that nothing can take the place of good butter for all high-grade goods.

Cream Caramels.

2 lbs sugar
1 pint double cream
8 ozs. glucose
8 ozs. fresh butter.

Boil the cream, sugar, and glucose in a copper to 250° F., stirring all the time.

Add the butter and continue stirring till the contents of copper reaches 258° F., then pour on to prepared oiled slab so that the "boil" will be about a quarter of an inch in thickness.

When cool enough, cut into small pieces with the cutter.

Chocolate Caramels.

2 lbs. sugar
½ pint double cream
¼ pint water
3 ozs. block chocolate (melted)
3 ozs. glucose
Essence of vanilla.

Proceed as for cream caramels.
Boil to 255° F.

Coconut Toffee.

1½ pints milk
1½ pints water
2 lbs. sugar
6 ozs. butter.

Boil to 255° F., stirring all the time, then add 14 ozs. of fine desiccated coconut, pour into prepared frame.

No. 1 *Russian Caramels.*

3 lbs sugar
1 pint double cream
10 ozs. glucose
Essence of vanilla
½ oz. coffee essence.

Place all in copper and boil to 249° F., stirring all the time. Pour on to prepared slab and cut when set sufficiently.

No. 2 *Russian Caramels.*

7 lbs. sugar
3 lbs. glucose
½ lb. butter
1 pint milk
Essence of vanilla.

Boil to 250° F., and finish as for No. 1. This is a less costly mixing and gives good results.

Coconut Caramels

2 lbs. sugar
½ lb. glucose
1½ pints milk
4 ozs. butter
8 ozs. medium desiccated coconut.

Bring the sugar and milk to the boil in a copper, add glucose and butter.

Stirring all the time, boil contents of copper to 255° F., stir in coconut and pour on slab.

Honey Caramels.

2 lbs. sugar
1 lb. honey
½ lb. golden syrup
1 pint table cream
1½ pints milk
5 ozs. butter
Essence of honey.

Boil the sugar, honey, syrup, milk, and cream up to 250° F., add butter and essence. Boil to 255° F., stirring all the time, and pour as usual.

For walnut caramels, add 10 ozs. of broken shelled walnuts to above.

Honey Jelly: Its Preparation and Properties

By GLENN H. JOSEPH, Ph.D.

Research Department, California Fruit Growers Exchange, Ontario, California.

The stickiness of honey is a disadvantage. If honey could be converted into a transparent gel with the elasticity and ease of cleavage characteristic of pure fruit jellies, its healthful sweetness would be more convenient to utilise.

Honey Jellies of the Past.

IN AN attempt to utilise the healthful natural sugars of honey, many housewives, and even commercial jelly makers, prepare fruit jellies and preserves by using some honey as a sweetening agent, substituting it for a portion of the cane or beet sugar ordinarily used. Many delicious products may be made in this manner, but, after all, they are not essentially honey products, and the lover of honey would never choose them in preference to the pure honey.

Realising the desirability of a jelly having the flavour of honey, several attempts have been made to gel honey by means of such agents as agar and gelatin, but up to the present time there are no successful products of this nature available. This is mainly due to the characteristics of the jellies which have been made. The jellifying of honey by such a material as agar resembles the setting of a sand-water mixture by cement, and results in a solid product having none of the desirable physical properties of the usual fruit jellies.

A very simple and truly scientific method exists whereby honey jellies may be made by utilising exactly the same natural forces for gelling as are responsible for the gelling of pure fruit juices. The gelation of pure fruit jellies, both home-made and commercial, results when certain amounts of the natural substance—pectin—are present in acidified sugar solutions of certain concentrations. Ordinarily the sugar content of pure fruit juice jellies must be between 60 and 70 per cent., with the acid about $\frac{1}{4}$ to $\frac{1}{2}$ of 1 per cent., calculated as citric.

Extracted or strained honey, with a sugar* content averaging from 70 to 85 per cent., offers an excellent source of the sugar for a jelly, because, with just a slight dilution, the solids may be adjusted to 60 or 65 per cent., and then, by adding small amounts of pectin and acid, a good jelly results. It has been found that products made in this manner are not wholly satisfactory when they are intended for commercial distribution, because they do not retain their pleasing texture after several months of storage, particularly in warm climates. They have a tendency to become darker in colour and develop a rubber-like consistency.

* Total sugars and total solids are used interchangeably in this discussion when referring to honey and honey jelly. The total sugar content is almost identical with the total solid content when the latter is determined by the refractometer.

Successful Honey Jellies.

As a result of a scientific study of such products, it has been found that these objectionable features may be overcome very easily. All that is necessary is to choose the proper balance between honey, cane or beet sugar, pectin, and the acid. The added sugar is not used as an adulterant or as a material intended to cheapen the jellies, but solely as a means of producing products with a good flavour, a desirable texture and consistency, and ones which will keep almost indefinitely under all ordinary storage conditions.

Likewise, good results are obtained only when proper care is used in choosing the kind of pectin and the amount of acid. Since honey possesses a delicate flavour and is naturally sweet, the jellies should not be made with a strong flavoured pectin nor by the use of acid in amounts ordinarily used for fruit jellies. Most liquid pectins are not as adaptable to honey jellies as are dry pectins, principally because apples are usually the source of the liquid pectins now on the market and the apple flavour obscures that of the honey. Some pectin products are so acidified that they produce satisfactory fruit jellies with very little additional acid. These pectins should not be used for making honey jellies because they would introduce unknown and probably excessive amounts of acid, causing a sour honey jelly to result. A tasteless and colourless dry pectin offers the best opportunity for producing honey jellies with the true honey flavour predominant.

The recipe given below may be used as a guide for producing good quality honey jellies with excellent keeping qualities. The recipe has been designed so that the finished jelly will contain approximately 60 per cent. of total sugar, with the honey sugar making up about 75 per cent. of this total and cane and beet sugar comprising the other 25 per cent. of the sugar. The acid of the final jelly should be about 0·07 per cent. as tartaric.

The firmness of the jelly depends to a large extent upon the final sugar concentration. Hence, in order to calculate a recipe, it is necessary to know the approximate total sugar content of the honey (total solids as determined by a refractometer will suffice), or, as is usually the case, to make a small trial batch with a given lot of honey and to alter the amounts of water used in subsequent batches so as to produce the desired firmness. For instance, if the following recipe produced a weak jelly with a certain lot of honey, the amount of water used should be reduced to about 8 pounds for the next trial.

A Suggested Recipe for a Honey Jelly.

Material.	*English Units.*	*Metric Units.**
Honey (extracted or strained) ...	20·0 lbs.	10·0 kg.
Sugar (cane or beet)	5·0 lbs.	2·5 kg.
Water	10·0 lbs.	5·0 kg.
Exchange "100" grade citrus pectin	4·0 ozs.	126·0 grams
Standard acid solution† ...	1·0 fluid oz.	33·0 cc.
Approximate yield	35·0 lbs.	17·5 kg.

Method of Procedure.

Heat the honey up to 170° F. in a jelly kettle, or in a steam or water-jacketed pan. In another jelly kettle, heat the water up to 170° F. and add, with stirring, the pectin which has been mixed thoroughly with 1 or 2 pounds of the sugar. Stir and heat nearly to boiling to dissolve the pectin. Add the remainder of the sugar and bring the temperature back to 170° F. This syrup is then added to the honey, which should be at 170° F.* After the containers are ready, stir in the standard acid solution, avoiding the incorporation of an excessive amount of air during this operation. Immediately draw out the batch into small containers (2 to 8 ounce size).

When the preserver wishes to package these jellies in large containers, 10 to 30 pounds, it will be necessary to increase the amount of pectin by 15 to 50 per cent. This is due to the fact that the jelly must be more rigid in the large containers in order to withstand commercial handling.

Pectin honey jellies made by the recipe given above and packaged in 2-ounce and 6-ounce containers have met with a very favourable reception in household use. These jellies in 1-ounce and 2-ounce glasses are also admirably suited for dainty individual service in hotels and clubs.

* These values are not the equivalent of, but are in proportion to, the amounts given in English units.

† The preserver's standard acid solution is made by dissolving ½ lb. (227 grams) tartaric or 1 lb. (454 grams) citric acid in 1 pint of water (474 cc.).

* It has been found that, when honey jellies are boiled as in the usual jelly-making procedure, the products develop a toughness, a darker colour, and a rather strong flavour, after a few weeks of storage. When 170° F. is the maximum temperature attained, the materials are fluid enough for proper mixing to be accomplished with freedom from entrapped air bubbles, and at the same time sterilisation may be effected.

Sugar Good for Health

THE absurd cult of "slimming" has fostered of recent years a popular feeling against sugar. This has been supplemented by some new theories concerning dental decay. That there is no foundation for this attitude towards sugar—including, of course, jam, sweets, and chocolate—has been conclusively proved by Dr. Laird, the Director of Colgate University Psychological Laboratory, New York, who has found by experiment that sugar enables rapid recovery from muscular fatigue to be made and that it also counteracts mental fatigue and helps to maintain mental poise.

Protracted "stuffing" with sugar foods undoubtedly tends to produce obesity, but only if the consumer is leading an idle life and does not dissipate the energy provided by the sugar. Athletes and young children often crave for sugar, and so do those who follow active and arduous outdoor occupations—another illustration of the golden rule of diet, "Eat what you fancy and fancy what you eat."

So far as dental caries is concerned, sugar itself has no effect on the teeth, harmful or otherwise. It is when the tooth brush is not used properly and when sugar is allowed to ferment in the crevices of the teeth that decay ensues.

(*Continued from page 252.*)

must be watched. In fermentation, temperature is the controlling factor. Similarly, in cake batters temperature must be controlled, since its importance has not yet been fully determined or understood. The temperatures and times of baking are now much more carefully controlled, and it is becoming the practice to install travelling ovens for the baking of slab and similar cakes, whilst electric baking is being given a very good trial because of the great flexibility of control.

Sponge Making Processes.

With the tremendous development of sponge goods and the competition which has resulted in the many cheaper varieties, much work has been carried out in order to evolve satisfactory methods, and on this work many new factories have commenced operations.

The best sponge cakes are made from eggs, sugar, and flour, but with the cheaper varieties milk has to be used as either a partial or total moistening agent, so that a method must be employed which will produce a sponge with the appearance, volume, and eating qualities of an ordinary sponge.

The methods employed have been highly successful in doing this, and research work is still being carried out to improve these. The aeration is brought about either partially by eggs and baking powder, or wholly by baking powder. Many of the goods produced are superior to those produced by the established methods, largely because the mechanical manipulation necessary for the whisking of the eggs to produce correct aeration is frequently done inefficiently. With the newer methods this defect is impossible, because the aeration is to be produced chemically. Further developments lie in concentrating on the moistness of crumb and the flavour of the finished goods. New mixers are available which will bring about greater aeration, since whisking is carried out under pressure.

English Cacao Buyers at Ibadan, Nigeria.

The Choice of Chocolate Ingredients

By L. S. FRASER, A.R.C.Sc., A.I.C., D.I.C., B.Sc.
(*Chief Chemist, J. S. Fry and Sons, Ltd.*).

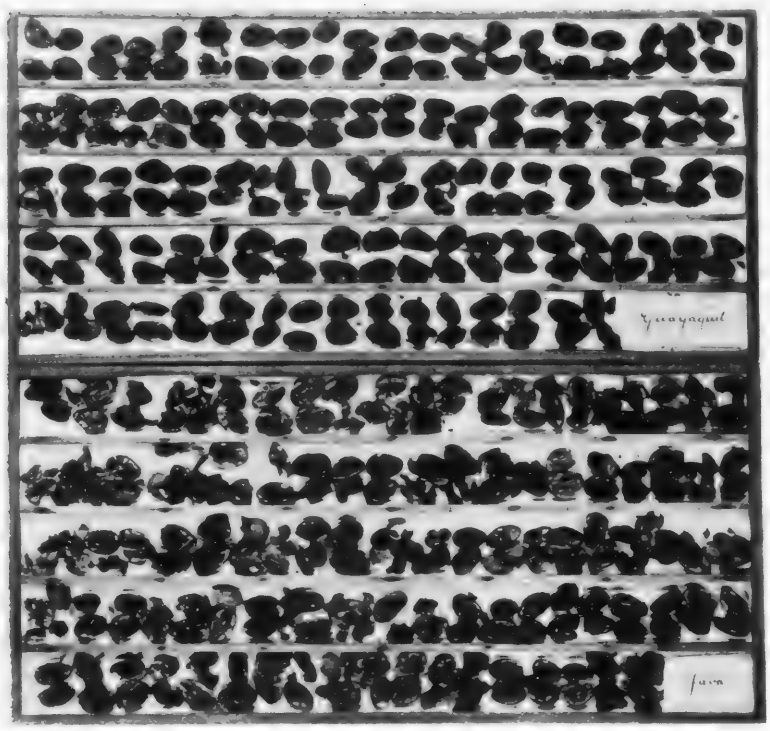
The best chocolate results only from the best ingredients.

IT IS not proposed to discuss here the exclusive use of the most expensive ingredients from which a chocolate may be produced, but rather to discuss how chocolates prepared from ingredients of almost similar cost may be quite different owing to the judicious selection of those ingredients. Hence, I do not hesitate to include such beans as those from the Gold Coast and from Nigeria among those suitable for the manufacture of good chocolates. But the fact that cost almost compels the manufacturer of a range of chocolates to use such beans enforces much more careful selection and inspection than would be necessary with the higher grades. This selection is in turn made more difficult by the increasing demand for raw cacao, and the large manufacturer is almost compelled to send English buyers fully conversant with his requirements to several cacao-producing countries in order to guarantee a supply of sufficiently high grade parcels.

In the case of cacao from some smaller producing countries, the actual selection by the manufacturer has to be left until the produce reaches this country, when samples are submitted by the sellers. Such samples are then examined for general size, presence of moulds or cacao moth, insufficient fermentation, etc., and upon the results of these examinations suitable parcels are purchased.

Upon the receipt at Messrs. Fry's of any consignment from any source, a sample of 3 to 4 lbs. taken from 30 per cent. of the bags in that consignment is submitted for further inspection and analysis. The analysis involves the determination of the weight of one hundred beans; moisture; percentage shell, germ and nib; and cacao butter in nib. As a result of this further inspection and analysis a consignment may be re-graded, there being normally three grades for the most commonly used beans.

A review of the analyses made each season of the raw beans has brought to light many interesting facts. For instance, whereas Nigerian cacao four or five years ago was relatively inferior to that from the Gold Coast, it has steadily improved since the introduction of Government inspection and is to-day almost on a par with the best Gold Coast cacao.



Beans Cut Ready for Inspection.

ACCRA AND NIGERIAN CACAO—SEASON 1926-1927.

Grade.	No. of Samples Examined.	Percentage Nib.			Percentage Shell.			Percentage Germ.		
		Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.
No. 1 Accra ...	35	88·0	86·3	87·2	12·9	11·2	11·9	1·0	0·8	0·9
No. 1 Nigerian	12	87·9	86·7	87·3	12·5	11·3	11·9	0·9	0·8	0·8

Grade.	No. of Samples Examined.	Percentage Moisture in Whole Bean.			Percentage Moisture in Nib.			Percentage Cacao Butter in Nib.		
		Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.
No. 1 Accra ...	49	8·1	5·6	6·8	6·6	4·6	5·7	55·1	51·2	53·5
No. 1 Nigerian	21	7·1	5·6	6·6	6·7	4·6	5·7	54·0	50·1	52·7

In the above table it will be noticed that though No. 1 Accra beans and No. 1 Nigerian beans were remarkably similar as regards percentage shell, germ and nib and also moisture, there was at that time a distinct difference in the cacao butter contents of the nibs.

Further, mid-crop cacao normally rejected on account of size and appearance was found to possess an abnormally low cacao butter content, this being one example of the generally established fact that there exists a relationship between weights of beans and their cacao butter contents.

Storage of Raw Cacao.

After purchase, the raw cacao needs to be carefully stored, and for this reason much attention has been paid to the construction of warehouses destined for cacao storage. It is considered essential in such warehouses to maintain an almost constant circulation of air, not only to inhibit the growth of mould on new crop cacao having a high moisture content, but also to inhibit the breeding of the cacao moth.

The illustration given here shows some of the ventilators which serve to maintain an almost constant draught throughout the new bonded cacao store at Messrs. Fry's Somerdale factory.

Sugar.

In the storage of the other main ingredient, sugar, particular attention has to be paid to "sweating," which can be avoided by suitable temperature control of the warehouse. The liability to "sweat" is more pronounced in the lower grades of sugar, of which a large range is always on offer. A sugar suitable for good chocolate manufacture should have a polarisation of not less than 99·95 per cent. and give a clear, almost colourless, 25 per cent. aqueous solution free from distinct flavours. Though a 25 per cent. solution may be slightly coloured, it should be entirely free from ultramarine. The detection of foreign flavours is particularly important in the selection of sugars; for instance, on one occasion, the writer had to reject a 400-ton consignment of best Continental beet sugar owing to its having an oily flavour.

The manufacturer of the lowest grades of chocolate often seeks a sugar which, though having a high polarisation and yielding a solution free from sediment, is cheaper than the best crystals owing to its brownish tinge and its contamination with a trace of molasses. With care in the selection of such a sugar he is often able to save much expense without affecting the character of his product and without any noticeable change in its poor flavour. But even a trace of molasses can be detected in finer chocolates, and thus the manufacturer of such chocolates is forced to use none but the most highly refined sugars. For milk chocolate, the flavour of which is much more susceptible to slight changes than is that of plain chocolate, it is even more essential that the sugar should be carefully chosen.

Milk Chocolate.

This brings me to the manufacture of milk chocolate, the essential ingredient for which is fresh milk, for no matter how many times a milk chocolate prepared from milk powder may be refined or how many hours it may be melangeured or conched, it will not resemble a chocolate prepared directly from

Messrs. Fry's New Bonded Cacao Store.

fresh milk. There are, of course, enormous difficulties which face the chocolate manufacturer who insists upon using fresh milk, the chief of which is a guaranteed supply; but those of us in the provinces, particularly in the West Country, have a distinct advantage in this respect. In our own case, the collection of the fresh milk from selected farms and its delivery to the central evaporating station involves such an organisation as would be almost prohibitive to small manufacturers. It may be argued that a very fine, smooth milk chocolate can be prepared from spray process milk powder, but the writer has always confirmed the generally accepted opinion that spray process milk powder is more liable to become rancid than is roller process powder, even after its inclusion in chocolate.

The writer has at times been aware of the manufacture of so-called "milk chocolate" in which the only "milk" used was separated roller process milk powder, additional cacao butter or even substitute vegetable fat being added to meet moulding difficulties. Such products only serve as a reflection upon the manufacturer's character and hasten the approach of legislation needed to safeguard the honest manufacturer and the public.

Cacao Butter Substitutes.

I cannot mention substitutes for cacao butter without adding a few comments on their use. A few years ago the use of such substitutes was very common. Now they are fast disappearing. This is at least one good result of the fall in the price of cacao butter and of market difficulties. At present the writer is unaware of the use by any of the larger manufacturers of a cacao butter substitute (excluding lecithin), though five years ago many chocolates revealed the presence of substitutes when their fats were tested by the turbidity method used in Messrs. Fry's laboratory.

Lecithin.

It will be noticed that I excluded lecithin above, as this can hardly be regarded as a cacao butter substitute. Personally, I regard its introduction into chocolate as most beneficial from the dietetic standpoint, but these are early days in its history and at the moment its flavour is such that the manufacturer must move very warily. Though there is little evidence to show that it inhibits the formation of fat bloom, it does definitely save cacao butter by reducing the viscosity of chocolate, and this alone is sufficient to warrant the serious attention of the manufacturer. When the production of lecithin has been still further perfected, I should be quite prepared to admit that its inclusion in any chocolate is not detrimental to that chocolate, but for the moment one must still regard the best chocolates as being prepared from cacao nibs (from finely selected beans and free from shell and germ), highly refined sugars, with or without the addition of fresh milk, and flavours.

(*Continued from page 263.*)

local minister some nice chocolate caramels with yellow soap centres, and he was very angry—even although it was the 1st of April!

Each new apprentice when he arrived had the job of going to the boiler-man with two big buckets for two buckets of steam. He generally came back and said that the boiler-man "swore awful."

As a boy I remember some of the celebrities who came over the borders. The late Mr. Evelyn Wood, of Packer's, had a big connection; and then we had the late Mr. Stephen Webb with his huge bales of Christmas samples driving up to our office door in a wagonette, and he was always adorned with a nice rose in his buttonhole. On the engineering side in these days the big man was Mr. Ernest Smith, of Luke Collier's, who now tells my friends here that he remembers me in knickerbockers sitting on a high stool in a Wee Scotch Sweetie Factory. Then in an undertone he tells them "Yes, and that was not yesterday."

Yes, we're proud of the sweet industry of Great Britain, and it's up to us to teach our boys that we expect them to carry on and go further than we have gone.

In conclusion we thank the publicity that our confectionery periodicals give us from time to time to vent our feelings and also the liberty they give us to do a little blowing of our own trumpets.

British Supremacy in Sweet Manufacture

By J. R. C.

WITH ANOTHER Olympia Exhibition close at hand where sweet manufacturers meet to compare notes and get new ideas, they pause to take stock of themselves and find out where they stand in this ever increasing industry. Our American friends in the trade tell us quite frankly that the candy makers of their country lead the world, but we disagree, for

"We disagree."

the manufacture of sweets is an industry of which the people of this country feel justly proud. We think that we lead the world and find it difficult to believe that we take second place.

I shall briefly review the industry and start by asking what country has produced chocolate factories to equal Messrs. Cadbury's, Fry's, Rowntree's, or Terry's, or where can one look for a firm like Clarnico, who produce high grade sweets in an almost unbelievable variety. What firm can rival Messrs. Barrett's, who are the greatest novelty firm for the production of the sweets that delight our kiddies?

Where can we find the country that can come within miles of our wrapped toffee firms with household names such as Mackintosh's, Nuttall's, Cremona, or Thorne's? Turn your attention now to our boiled sweet manufacturers. We have a huge army of firms famous for the production of the sweet that is regarded as the foundation of all sweet manufacture—firms such as Messrs. Pascall's Needler's, Whitefield's, and Eclipse Candy Co., in whose beautifully equipped factories boiled sugar is moulded into artistic shapes and colours. Some of these firms still train their apprentices to make rocks in floral and letter designs. They believe that in doing so they keep up a reputation for artistic work that is well worth maintaining. Other firms have allowed this art to die out, considering the process much too slow, for rock cannot be made mechanically, although it can now be rolled and chopped by ingenious machines.

I have referred to only very few of the many branches of our great industry and have mentioned a few of the household names of firms that are specialists. There still remains a vast army of manufacturers who make a large variety of sweets, firms such as Messrs. Buchanan Bros., Keillers, Maynards, Edmondsons, Faulders and Mortons. The last named are big exporters and are said to be opening up factories abroad. We have also in our midst firms who are particularly prominent for the successful

"Rock can now be rolled."

production of one line. The rise of some of these firms to fame is such that they are both envied and admired by their rivals, for this is the goal at which all progressive firms aim in the hope of "striking a

winner" and of "catching the public fancy." To get away with a line, the merits of which are distinctive and original, is the ambition of every firm. It would be difficult to name at random half a dozen such firms. To those who have done it, we say "Good luck, and may you continue to go ahead!"

With an industry such as this claiming, as I have claimed for it, undoubted pre-eminence, there are many other industries to thank, viz., the sugar manufacturers and the sugar brokers, as well as the glucose makers who are famous at the moment.

Glucose is a cure for many of our bodily ailments, particularly for juvenile asthma. It is now used extensively in our leading hospitals, and I understand further developments are daily expected through its curative properties. Why could not our early confectioners have given this wonderful product a name such as crystal syrup, and not something that sounds like glue? Perhaps glucose manufacturers will take this hint and remedy an old grievance, now that their product has become a national asset in medical circles. Please don't think that this article is an advertisement for Corn Products, although I confess that I do buy a little from them, being partial to their tank delivery system and the fact that they now make glucose in our own country.

With sugar and glucose disposed of, we will thank the other thousand and one ingredient manufacturers for their co-operation and pass on to another army of co-operators, viz., the engineering industry. The immense strides made in sweet making machinery

"Glucose is a cure for many bodily ailments."

during the last forty years has really been remarkable. The genius displayed by firms like Messrs. Baker Perkins Ltd., Brierley, Collier and Hartley, Low and Duff, and by various continental firms.

Much of the success of these firms has been due to the deep study they have each and all made of our varied requirements, and one has only to recall the display made by one of our leading engineering firms at Wembley to understand the great debt we owe to our confectionery engineers. In these days with the call for production we can't blame the want of machinery.

Now what about the thousands of individuals employed in our toothsome and pleasant daily task? To single out any particular person or persons would be difficult. They are all such nice, good people—all busy trying to sweeten up the little crowd who are

"Asking for two buckets of steam."

not sweet makers like themselves. To anyone who has made sweets for a lifetime it must be a source of satisfaction to think of all the kids whose lives they have brightened. Picture all the kids who have put bigger lumps of toffee into their mouths than they could conveniently munch up before teacher spotted them! Think of the thousands of hearts that have been won by the gift of a nice box of sweets!

Can you recall the days when we used to make a boiled sweet called "Hypocrites"—pink casing, pulled inside and flavoured with plenty of cayenne and ginger and passed through the acid drop rollers?

Yes, and I can also remember when I gave our

(*Continued on page* 261.)

Trade News

Mr. George C. Irwin.

We have to record the death, on July 31, of Mr. George C. Irwin, the Managing Director of S. H. Johnson and Co., Ltd., Engineering Works, Stratford, London. For many years Mr. Irwin conducted the management and administration of the business in a most admirable manner, and his kindly personality will be sorely missed by all with whom he came into contact.

* * *

Mr. F. J. Clarke.

We are informed that Mr. F. J. Clarke is leaving Messrs. York, Shipley, Ltd., to take up the position of sales manager of the British Isles for Messrs. Storer, Rogers and Hughes, of Saffron Hill, London. This firm is a subsidiary of the Cherry Burrell Corporation of U.S.A., manufacturing milk and ice-cream machinery. Their plant is treating 80 per cent. of the milk supplied to New York and Chicago.

* * *

Soya Flour.

With reference to the paragraph on the manufacture of soya flour in Manchuria, appearing in our editorial remarks of the August issue, we had our attention drawn to the fact that an edible soya flour containing 20 per cent. fat, 43 per cent. protein, 22 per cent. carbohydrate, and *no starch*, has for some time been manufactured by a British concern, the Soya Flour Manufacturing Co., Ltd., of 7, Mincing Lane, E.C. 3, who operate an extensive plant in North London.

The process this company is working is well protected by patents, and since the establishment of their factory last year an extensive business has been done with bakers, confectioners, chocolate, ice-cream, biscuit, and sausage manufacturers.

The company, we learn, is exhibiting at the forthcoming Bakers' and Confectioners' Exhibition and is endeavouring to make the flour an Empire product by fostering the growth of soya beans in the Empire. We understand that negotiations are being conducted to obtain their supplies of soya beans from South Africa, from where small consignments have already been shipped.

* * *

Stainless Aluminium.

We are informed that the Midland Metal Spinning Co., Ltd., of Wolverhampton, are putting on the market a stainless aluminium for food containers. It is claimed that this metal has all the advantages possessed by stainless iron and steel, with the additional advantages that it is a third of the weight and is less costly. This firm will produce plant and equipment in both stainless cast and sheet aluminium.

* * *

Oil Purifiers.

We have received a booklet giving details of the Sharples Oil Purifiers, which are fitted on a large proportion of motor passenger liners for the treatment of fuel and lubricating oil for the main and auxiliary engines. Further details will appear in a later issue.

* * *

British Can Shares, Inc.

American Can interest in British Can, it is now announced, is shared by Thermokept as well as Gold Dust and others, the combined group having formed British Can Shares, Inc., to take over the manufacture in the United Kingdom of containers for fruit, vegetables, and meats.

Enquiries

125. Advice required on latest processes for canning sour-krout.

126. Can you supply us with names of manufacturers of wax paper?

127. Required formulæ for first and second qualities raspberry jam. Also formulæ and processing methods for a confectionery double cream.

128. What would you suggest to produce a rich glossy surface on the face of an open lemon curd tart? We have read with interest the several enquiries on the subject of lemon curd making, and particularly enquiry No. 112, with reference to the prevention of cracking in the curd. We have tried the method you suggest, and although the cracking is prevented, we find that there is a strong tendency to lose the gloss when the curd has been baked out in open tarts.

129. We shall be obliged if you can put us into touch with any biscuit manufacturer who could handle a speciality biscuit for us, at the rate of 2 to 2½ cwt. per week, we supplying the mixture. We are in the position of being able to supply also the tins necessary, packing material, and shavings. The work we wish done is the manufacture of our special materials into biscuits, and their delivery here packed.

130. Could you furnish us with the address of the makers of machinery for filling into jam jars of mincemeat and for the manufacture of salad dressing or cream?

131. An Australian manufacturer and importer wishes to get into touch with makers of waxed cardboard containers, and also with makers of machinery for containers.

REPLY TO ENQUIRY NO. 122.—*Formula for a Starchless Lemon Cheese.*

Below is a formula for starchless lemon cheese. This may be cheapened if required:

Lemon juice, 1 part.
Margarine, 2 parts.
Frozen eggs, 6 parts.
Sugar, 8 parts.
Colour.
Lemon oil.

Melt the butter first and then add the sugar and lemon juice. Stir until dissolved. Add the eggs and heat until homogeneous. The colour should be dissolved in the smallest amount of water possible, and the lemon oil should be added last of all.

The formula may be cheapened by replacing the lemon juice with citric acid and water, and the frozen eggs with dried egg albumen.

Starchless lemon cheese is not of any great value to pastrycooks, as it boils over when baked. It is essential therefore to bake the pastry first when using the starchless product, and add the lemon cheese when cold.

REPLY TO ENQUIRY NO. 118.—*Formula for an Effervescent Lemonade Powder.*

Effervescent lemonade powders are made up in a manner similar to that described for the crystals in the June issue. Effervescing ingredients are needed in addition. These are composed of sodium bicarbonate and an acid. The acid is selected from the following:

Citric acid, tartaric acid, cream of tartar, sodium pyrophosphate, and calcium acid phosphate. Each of the above-mentioned acids behaves differently in combination with sodium bicarbonate. Tartaric acid and citric acid act very rapidly on the sodium bicarbonate in the production of gas. These acids also store badly in contact with sodium bicarbonate and deteriorate readily. Calcium acid phosphate and cream of tartar are less vigorous and produce a slower effervescence, but they store much better when made up. Sodium pyrophosphate is less vigorous still, but keeps almost indefinitely in mixtures. Calcium acid phosphate is apt to produce cloudiness.

It is usual to make up a combination containing at least two acid ingredients, such as:

Tartaric acid, 1 part.
Cream of tartar, 1 part.
Sodium bicarbonate, 2 parts.

A proportion of this mixture is then added to the lemonade powder. Sodium pyrophosphate (trade name "Crephos") may be advantageously substituted for the above-mentioned cream of tartar, and a better keeping mixture is thereby produced.

The proportion of added effervescing mixture will depend on the result required, and usually 1 lb. per cwt. of lemonade crystals is sufficient.

A typical recipe for effervescing lemonade powder is as follows:

Sugar, 56 lbs.
Citric or tartaric acid, 2½ lbs.
Terpeneless lemon, 3 drams.
Colour, 2 oz. of 10 per cent. solution.
Effervescing mixture, 6 oz.

The Causes of Food Poisoning

IN a leading article on the cause of food poisoning, the *Lancet* (June 21, 1930, p. 1354) points out that the tendency during the last two decades has been more and more to regard the Salmonella group of bacteria as the most important cause of food poisoning; it is stated, however, that this organism cannot be held responsible for every food poisoning outbreak outside the rare cases of botulism. Savage and Bruce White have shown that certain dysentery strains produce food poisoning. *Bacillus proteus* group has also been brought forward, although the supporting evidence is slender, and a very clear case would have to be made out before any particular outbreak could be accepted as having such an origin. The same is true of the *B. coli* group, where the evidence has been less cogent. On the other hand there have been many outbreaks of gastro-intestinal disturbance in which bacteriological investigation has failed to detect the responsible organism. This has been especially noted in the case of outbreaks associated with consumption of cheese and milk, and in some of them the possibility of salmonella infection can be ruled out. Dack, Cary, Woolpert, and Wiggers (1930)* have recently suggested a new possibility. These authors described an outbreak of food poisoning affecting eleven persons in Chicago after eating three-layer sponge cakes filled with cream. Nine persons were actually ill with vomiting, mild cramp, and severe diarrhœa. Bacteriological examination of the cake substance revealed a yellow hæmolytic staphylococcus as the most prevalent organism. A human volunteer who drank 25 c.cm. of a sterile filtrate from a broth culture became ill exactly three hours later with extreme prostration, diarrhœa, and apparently some vomiting. Two other human volunteers who drank 10 and 5 c.cm. respectively had minor symptoms.

Professor Jordan,† the head of the same laboratory, tested the effect of other staphylococci and isolated five strains which yielded filtrates toxic when taken by the mouth. Three were isolated from normal human throats, one from a case of human septicæmia, and the other from cheese suspected of causing an outbreak of food poisoning in a village in Porto Rico. These five strains, and also the cake strain, differed from one another culturally and so did not represent a homologous type.

Professor Jordan concludes that various strains of streptococci of diverse origin and different cultural characters are capable of generating in a broth culture a substance, which when taken by the mouth produces gastro-intestinal disturbance, and suggests it is not unlikely that bacteria of other groups may produce similar substances that are irritating to the human alimentary canal.

The *Lancet* states if these observations are confirmed and found applicable to this country it may be possible to explain more of our minor food outbreaks.

* G. M. Dack, W. E. Cary, O. Woolpert, and H. Wiggers, *Journ. Preventive Medicine*, 1930, Vol. 94, p. 1648.

† E. O. Jordan, "The Production by Staphylococci of a Substance causing Food Poisoning," *Journ. Amer. Med. Assoc.*, Vol. 94, No. 21, May 24, 1930, pp. 1648-1650.

Correspondence

To the Editor.

DEAR SIR,

I have read with interest the article by Dr. Lewis in the February issue of FOOD MANUFACTURE, also the letter in reply from Mr. A. Samson in the April issue. Both these gentlemen contribute opinions of value and interest to the discussion. Dr. Lewis states that Mr. Samson's letter is "interesting from the point of view of the manufacturer of lacquer." But surely it is of equal interest to the food packer? Mr. Samson himself is first and foremost a food chemist, and interested in lacquered plate in so far as it helps to reduce his problems in connection with food packing. He has, from practical experience, decided that lacquered plate is at the moment essential for the tin meat container, and, indeed, "looks to lacquer to save the tinplate"—presumably from being attacked by meat or other causes. I am entirely in agreement with Mr. Samson when he takes exception to the statement of Dr. Lewis "that meat packed in glass with lids of good quality tinplate without lacquer showed no signs of discoloration." If this were generally the experience of meat packers, surely they would not be more and more adopting lacquer, as they are.

Every lacquer manufacturer finds his sales to makers of containers and closures for the food industry increasing rapidly, and the meat packing section is no exception. Packers would not be willing to incur the extra cost of lacquering, small as it is, if good results were not abundantly proved. Leading meat packers use lacquered plate; most of it is for caps, but a certain amount is for containers.

In America the meat packers are even willing to pay for double and treble lacquering of their caps; indeed, I have met with one firm who use four coats. I am not agreeing that more than two coats is ever necessary, but I do assert that one is absolutely essential and two better in certain cases.

The problem is not really whether to lacquer, but how to lacquer and what to lacquer with.

In fact, in the food packing industry lacquered plate is accepted as a necessity, but better containers and better lacquering, if possible, are desired.

Now, there are many ways of improving lacquering methods, and, thanks to the co-operation of far-seeing food chemists of the type of Mr. Samson, and also with the assistance of can, cap, and lacquer makers, considerable progress has been achieved during the last few years. I wish I could believe that tinplate manufacturers had been equally enterprising. It is felt, however, by food packer, can maker, and lacquer maker—all three—that improvement in the quality of tinplate for food products has not advanced in anything like the same ratio as in lacquer, can, and cap making.

The complaints that occur from time to time of faults in food packing originate with the tinplate itself, which arrives too often in a greasy and dirty condition at the can maker's. The plate is not always properly cleaned before lacquering, and the excuse given for this neglect is usually that buyers of containers and closures will not pay sufficient for it to be done, that competition is terrible, and price-cutting in the trade is reckless.

Before concluding, however, I would like to refer briefly to a point in Dr. Lewis's letter in your April issue. With regard to the coating of tin on a plate, my experience leads me to prefer an evenly coated plate to an unevenly coated one, regardless of thickness, where lacquer is to be applied. Danger, however, may lie in both extremes—too thin or too thick. It is not always the thickly covered sheet of tin that makes the best surface for lacquer.

Yours faithfully,

A. L. MATTHISON.

To the Editor.

DEAR SIR,

As a manufacturer of sweets for a lifetime, it gives me great satisfaction to see a leading Food Journal like yours giving space and attention to the Sweet Manufacturing Industry. We sweet-makers feel we are food producers in reality and not makers of luxuries—as some good folks would have us believe. Sweets carefully selected can act beneficially to the purchaser in so many different ways. They can be eaten at times when it would be inconvenient to eat ordinary food. Many a time they quench a thirst that badly needed quenching. They often arrest the cold that was just beginning to be troublesome. Frequently that lady friend who was getting a little bit cross is put into a most genial mood by an offering of her favourite delicacies. They are endless in variety, in texture, in flavour, in shape, and each manufacturer seems to produce something entirely different from the other fellow. Now they are for motoring, for week-end tramping, and summer and winter use. They are packed in such dainty wrappers, made up in such delightful boxes, packets, and tins, and all done up in a way that they win the approval of all food specialists outside of the sweet industry. The proof of all this can be verified by a visit to the coming Confectioners' Exhibition at Olympia, which opens on August 27. All interested in Food Manufacture should make a point of seeing how food of the sweet species is made, packed, and sold. This Exhibition promises to be a huge success this year, in spite of the present trade depression, and a record attendance is anticipated by its promoters.

Yours,

AN OLD SWEET FOOD MAKER.

To the Editor.

DEAR SIR,

I hope you will allow me a little space in your valuable journal to comment on Dr. Callow's article on "The Curing of Bacon and Ham" in your August issue.

In discussing the comparative use of nitrate and nitrite in curing pickles, Dr. Callow has doubts as to the efficiency of nitrite. He has grave fears that nitrite will tend, not to decrease, but rather to increase, the amount of spoilage due to anaerobic bacteria. This is certainly not corroborated by the exhaustive tests conducted, and the conclusions arrived at, by Lewis and Moulton, of the American Institute of Meat Packers. The bacteria with which they experimented were typical anaerobes, such as are found in spoiled hams. These bacteria were *Clos. Sporogenes, Clostridium putrefaciens,* and *Clos. putrificum.* In all cases it was definitely proved that nitrite had greater powers than nitrate in inhibiting the growth of these anaerobes. In fact, it was shown that nitrite was approximately ten times more powerful than nitrate. Hence, from a spoilage point of view, no complaint can be made against the use of nitrite.

On the question of flavour, although bacteria are essential for the reduction of nitrate to nitrite, the many tests on flavour and palatability so nonplussed the American examiners as to leave them very undecided as to which were nitrate-cured and which were nitrite-cured hams. In fact, there was a slight preference for the nitrite-cured.

Finally, with reference to the use of pure cultures of bacteria to act as "starters" in the curing pickles of the future, I was informed a few years ago that an American packing-house had used pure strains of bacteria in sterilised brines—with what degree of success I am unable to say.

Yours faithfully,

A. SAMSON.

London, N. 7. (Poulton and Noel, Ltd.)

Abstracts and Reviews

Technical Control in Bread Baking.

THE production of baked articles is becoming a specialised industry, bread baking particularly requiring considerable technical control. The larger American bakeries employ large chemical and engineering staffs. The problems of technical control are concerned with the raw material or ingredients, the process, and the product. The raw materials include storage, blending of flour, weighing of ingredients, and dough formulæ; the process includes mixing the dough, fermentation, mechanical operations, proofing of dough and baking; the product includes cooling, wrapping, adequate protection from contamination, quality of product, and nutrition.

Flour may vary from year to year; modern milling aims at selecting and blending wheat on the basis of tests, particularly of baking qualities. The biological condition of flour in reference to count and presence of micro-organisms is an important part of flour control. The presence of certain bacteria is a primary causative factor in the future development of rope in the product. Mould infection is readily determined by microscopic and cultural methods. Interpretation of any baking test or system of tests requires experience and a background of data collected from many tests of all types of flour. The storage problems of raw materials control are important in relation to flour and yeast, in which temperature and humidity control are among the chief factors.

The fermentation of bread doughs, from the scientific standpoint, is a highly complex phenomenon, involving chemical and physical changes which do not readily lend themselves to complete and satisfactory explanation. Inherent variables are present in relation to yeast and enzyme activity and to concomitant changes in the physical properties of the dough. Practical measures for influencing yeast and enzyme activity, and the physical properties of the dough, refer back to four characteristics—stability, fermentation tolerance, composition, and properties of ingredients present in the dough. The foam structure of dough is fixed by the coagulation of the protein by heat. Starch undergoes some degree of gelatinisation, and the coagulated protein and starch exhibit changes in physical properties in the direction of elasticity. The high temperature of the exterior of the loaf results in dextrinisation of carbohydrates in the crust, as well as pyro decomposition of carbohydrates and proteins, with the resulting changes in colour.

The composition and nutritive properties of bread have been the subject of considerable investigation, and fundamental knowledge is now well established.

Technical control in the baking industry is an extensive one, and the general treatment of it is limited to some of its more important problems.

(Abstract from *Food Industries*, January, 1929, pp. 148-153.)

Medical Aspects of Cider.

(*Herbert E. Durham*, Brit. Med. Journ., *June* 28, 1930.)

Durham points out that the chief difference between cider and wine is that wine contains tartaric acid, or acid tartrates, while they are completely absent from both cider and perry when these are in pure condition. Wine contains a certain amount, usually small, of malic acid, much of which, however, is turned into lactic acid during maturation. Wines, then, contain tartaric, malic, and lactic acids; ciders only malic and lactic acids—apart from small amounts of volatile acids in both. The absence of uric calculi and other gouty phenomena in cider districts, in contrast to wine-drinking districts, is believed to be due to the fact that cider promotes diuresis and that the active constituent is malic acid.

Durham points out that many medical beverages on the market named "cider" are, in fact, strongly sophisticated with tartaric acid. A simple test is given to detect any inordinate amount of tartaric acid present. It is carried out as follows: To a third of a tumblerful of cider about half a teaspoonful of milk of lime is added slowly and well stirred; further small additions are made until the liquid begins to change colour to a deeper and browner hue, showing that the acids are nearly neutralised. Then a small further addition of the cider is made so that the original colour may be restored; the liquid must be in a fairly acid condition, for, when it is alkaline, malate of lime and tannin are also precipitated. After thorough stirring, the glass is left till the following day, when, if tartrates are present, a fine crop of very bright little sandy crystals—orthorhombic, with obliquely cut ends—will have formed and settled out or become attached to the sides. With a pure cider no such crystals are seen. Instead of milk of lime, liquor *calcis saccharatus* may be used, but its action is rather slow, though very fine, large crystals are eventually deposited.

Food Investigations.

(*Report of the Food Investigation Board for the Year* 1929. *London, H.M. Stationery Office*, 1930. *2s. 6d. net.*)

The *British Medical Journal* gives the following account of the Report of the Food Investigation Board for 1929:

Under modern conditions foods are seldom consumed at their time or place of origin, and their storage or transport in good condition is not only of hygienic interest, but also, where large quantities are concerned, of the first economic importance.

The Report points out that production, transport by sea and land, storage, the wholesale market, and the retail market are all stages through which much of the food supply of this country has to pass in its progress to the consumer. The food industry is not one, but many, and its diversity is well reflected in the variety of the problems which have engaged the attention of the Board's investigators during the year. One inquiry was carried out in order to ascertain the causes of the loss of bloom during the transport of New Zealand frozen mutton and lamb.

Thirty-one Border Leicester-Southdown cross lambs were slaughtered under supervision, and the carcases were divided into three lots, covered with stockinette wraps and frozen at 10° C. The first lot were further wrapped in wax paper to reproduce conditions of high humidity; the second lot were left covered by the stockinette wrap only; the third, also covered with stockinette only, were taken out of store to "sweat" at intervals. When the three lots, after eighteen weeks' storage at 9·7° C., were sent to Smithfield for the opinion of the trade, the first lot were classed as showing perfect bloom, the second lot as slightly dull in appearance, and the third as most unsatisfactory. The first lot realised ½d. per lb. more than the third. The conclusion was drawn that the deficiencies of the second and third lots were entirely due to excessive drying of the muscle.

Preliminary experiments were also carried out during the year on the micro-flora of cold stores. In one such store, at 19° F. the air contained only three organisms per litre, and the water melted from the ice round the brine pipes contained only six organisms per cubic centimetre, suggesting that the bacterial contamination of carcases from aerial sources is, under such conditions, negligible.

Biochemical studies on the action of bacteria on meat at different temperatures added weight to the suggestion, made on

other grounds, that it is good practice to cool carcases immediately after slaughter to a temperature near zero.

Studies of the effect of climatic conditions on the storage life of apples revealed no obvious correlation between the complete growing season and the life of the fruit in storage, but good keeping quality was associated with warm, dry weather during the few weeks preceding the date of gathering.

The Board's investigators observed that a low concentration of acetaldehyde in the atmosphere is useful in fruit storage, inhibiting or killing fungal spores without ill-effect upon the fruit itself. Another inquiry dealt with the losses of fruit which result from rotting following the invasion of the cut stalks by moulds, with special reference to the suggestion that the treatment of the cut stalks with a fungicide or equivalent preparation would serve as a prophylactic. Complete success was attained by dipping the ends of the cut stalks in molten paraffin wax. The Report also contains accounts of investigations on the temperature and wastage of fruit during oversea transport, the freezing and storage of mild cured bacon, the rate of evaporation of eggs, the corrosion of tinplate in canning, the refrigeration of fish, and the thermo-physical properties of refrigerants. A description is given of a small refrigerating plant for road and rail transport, using a methyl chloride evaporator and potassium chromate brine, which worked well on railway runs between London and Aberdeen. The concluding section relates to researches conducted for the Director of Food Investigation by the Imperial College of Science and Technology.

Food Poisoning due to Eggs.

(*W. M. Scott,* Brit. Med. Journ., *July* 12, 1930, *pp.* 56-57.)

This author, during the last three years, cites a number of cases of severe and fatal gastro-enteritis affecting both single individuals and groups of people, due to salmonella infection, from eating ducks' eggs. He states: "It has never been possible to bring absolute proof; for this, some part of the egg must remain for examination and yield the specific salmonella in culture. But circumstantial evidence has been so strong in most of the instances that the absolute proof becomes quite unnecessary."

He describes a few examples of cases that have come his way, and he states there is quite a literature upon the subject, and quotes a monograph published in 1906 by A. Lecoq in Paris on poisoning caused by whipped cream. In this monograph Lecoq shows that the poisoning properties of such creams prepared by mixing cream, gelatin, and white of egg have long been known. He shows that these poisonous properties appear most commonly in summer, that they are not due to metallic poisons—copper, tin, or lead dissolved from the mixing utensils—as it was once the fashion to suppose, nor are they due to putrefactive products, ptomaines, etc., but that they are due to bacterial infection of the egg albumen. He discusses the various ways in which ducks' eggs become infected. Infection of hens' eggs is far less frequent than in the case of ducks' eggs.

He states that the risk of infection is comparatively remote; it is difficult to estimate what proportion of the millions of eggs consumed each day in this country consists of ducks' eggs, but it must be at least many thousands, while food poisoning from eggs is so comparatively rare that it has hardly hitherto been regarded seriously. Scott, however, is inclined to think that salmonella infections from eggs are, in reality, a little more common than generally believed.

Books.

The Essential Elements that Constitute a Balanced Food. By C. N. Kinney, Professor of Chemistry in Drake University. Published by the Success Composition and Printing Co., Iowa, 1930. Pp. xvi.+303.

The volume under review contains twelve chapters, each dealing with the nature and function of the various metallic and non-metallic elements that are usually present in a normal food. The object and purpose of the book is to review ideas on foods and to attempt to clarify the controversy and discussion that is taking place at the present time. The author deals in particular with the importance of the presence of minute traces of such elements as zinc, nickel, copper, manganese, barium, cobalt, strontium, bromine, and iodine present in organic combination in plant and animal life, and their possible influence on physiological and digestive processes. Reference is made to the important influence of minute traces of metals on the properties of enzymes, oxidases, hormones, vitamines, etc. The volume brings out in a striking manner the passage of traces of elements—present in quantity in the earth's crust—into plant life and eventually into foods, and the possible important influence of traces of these elements, acting as catalysts, in the formation and synthesis of highly complex bodies such as the hormones and enzymes, which play such important rôles in food and life processes. Professor Kinney deals in a critical manner with the recently published literature and researches on the subject, and in the present volume offers an important contribution to the extensive researches which are now in progress on food problems, together with a discussion of the whole question as to what constitutes a balanced food. All these questions are approached from an original and novel standpoint.

Cocoa and Chocolate Manufacture. H. W. Bywaters, D.Sc., Ph.D. London: J. and A. Churchill. 21s. net.

The author of this volume is well qualified to write on the subject of cocoa and chocolate, having been for many years chief chemist to Messrs. J. S. Fry and Sons, Ltd., cocoa and chocolate manufacturers, Bristol, and now a director of Messrs. Slade and Bullock, Ltd., Dewsbury. This volume is a technical treatise on the subject and is a valuable contribution to the literature, the subject-matter being dealt with in a thoroughly practical manner. *Cocoa and Chocolate Manufacture* bears the hallmark of having been written by one who has had a long and intimate experience of the industry. The author has succeeded in compressing into a small compass an unusually large amount of technical data. Scattered throughout the book are many items of information not to be found in existing textbooks concerning the modern technical aspects of cocoa and chocolate manufacturing operations.

The volume includes a detailed account of modern manufacturing methods, together with a résumé of the progress of the industry from the technical and mechanical standpoints during the last thirty years. The book is divided into sections dealing with (i.) raw materials, (ii.) cocoa manufacture, (iii.) chocolate manufacture, and (iv.) miscellaneous methods of manufacture and preparation. A well-developed account is given of the preparation of the cocoa beans, their commercial sources, transport, treatment, storage, and details of chemical tests applied to the products. An interesting illustrated description is given of the types of machinery introduced into the cocoa and chocolate industry during the last few years. The machines are well described and the illustrations well reproduced.

E. W. L.

Publications Received.

Canners' Bulletin, No. 1.: *Springers, Hydrogen Swells, and Perforations in Canned Fruits.* F. Hirst and W. B. Adam, University of Bristol Research Station, Campden, Gloucestershire. 15 pp. May, 1930.

Canners' Bulletin, No. 2.: *The Use of Sugar Syrup in Fruit Canning.* F. Hirst and W. B. Adam, University of Bristol Research Station, Campden, Gloucestershire. 16 pp. June, 1930.

A Comparison of Ageing Periods for Ice-Cream Mixes. J. C. Hening. Technical Bulletin, No. 161. New York State Agricultural Experiment Station. 21 pp. April, 1930.

Chemistry and Analysis of the Permitted Coal Tar Food Dyes: Ponceau SX, Sunset Yellow FCF, and Brilliant Blue FCF. O. L. Evenson and H. T. Herrick, Dept. Bulletin, No. 1. U.S. Dept. of Agriculture. 8 pp. March, 1930.

Service and Regulatory Announcements. Bureau of Animal Industry. U.S. Dept. of Agriculture. 8 pp. May, 1930.

Foaming of Milk and Cream. C. S. Leete. Circular No. 108. U.S. Dept. of Agriculture. 6 pp. March, 1930.

Control of Insect Pests in Stored Grain. E. A. Black and R. T. Cotton. Farmers' Bulletin, No. 1483. U.S. Dept. of Agriculture. 30 pp. Revised December, 1929.

Financial News

The Editor cannot accept responsibility for any errors which may appear in the Financial News Section.

BANK RATE (1929–1930)

1929.		1930.	
Feb. 7	5½ per cent.	Feb. 6	4½ per cent.
Sept. 26	6½ ,, ,,	Mar. 6	4 ,, ,,
Oct. 31	6 ,, ,,	,, 20	3½ ,, ,,
Nov. 21	5½ ,, ,,	May 1	3 ,, ,,
Dec. 12	5 ,, ,,		

Those responsible for the marketing of edible commodities recognise the need for adapting existing machinery and specialised knowledge in order to keep abreast of altering trade and general conditions, and one of the main departures during the last financial period took the form of new food products based on massed production. In many instances the results will not be reflected in the published accounts until twelve months hence, although there is ample evidence in the magnitude and implication of some of the final figures covering the 1929 and 1929-1930 financial year to justify the conclusion that the popular demand is being satisfied, and all interested in the food industry will watch with the closest interest the practical results of these developments.

* * *

The slump in prices and the decreased purchasing power of the people are reflected in the accounts of **Crosse and Blackwell, Ltd.**, which obtains its raw materials from and sells its preserves in all parts of the world. Compared with 1928, the amount of net profit realised during the year ended December 31 last shows an increase of a little more than 4½ per cent., the appropriation account being made up as follows:

	£
Brought forward from 1928	60,070
Net Profit for year ended December 31, 1929 ...	211,205
	£271,275

	£
7½ per cent. dividend on £2,250,000 cumulative participating preference shares of 15s. each ...	168,750
Transferred to Reserve	50,000
Carried forward to 1930	52,525
	£271,275

Some of the principal figures for the last two years are compared below:

	1929.	1928.
	£	£
Total Income	287,510	272,612
General Expenses	33,011	38,058
Interest	43,294	32,475
Net Profit	211,205	202,080
Preference Dividend	168,750	168,750
To Reserve	50,000	25,000
Bank Loans	452,765	316,045
Mortgages	112,500	105,000
Sundry Creditors	762,454	501,466
Properties	1,458,716	1,175,458
Machinery, etc.	657,415	490,721
Stock	1,022,414	766,873
Goodwill, Trademarks, etc. ...	1,654,569	1,450,000
Carried forward	52,525	60,070
Ordinary Dividend	nil	nil

It is anticipated that substantial economies will be effected in the vinegar section during the current year as the result of the amalgamation with **Champion and Slee, Ltd.**, and with **Sarsons, Ltd.** The preference shares at 10s. 10d. yield about 10·38 per cent., while the 1s. ordinary shares, of which £264,248 have been issued, stand at about 1s. 10d.

The profit and loss account of **Associated Biscuit Manufacturers, Ltd.**, which was registered in 1921, and which owns the entire ordinary share capital of **Huntley and Palmers, Ltd.**, and **Peak, Frean and Co., Ltd.**, shows a credit balance of £198,807, being an increase of £1,206 as compared with the amount of profit realised during the year ended March 31, 1929. As, however, the sum brought in was considerably less than the previous year, it was found necessary to reduce the dividend on the company's £1,400,140 ordinary shares from 13½ per cent. to 11 per cent., and, after writing off £12,937 as against £15,000 a year ago, the sum of £3,843 has been carried forward to the current year. The chief items in the final accounts and balance sheet are compared below:

	Mar. 31, 1930.	*Mar.* 31, 1929.
	£	£
Profit	198,807	197,601
6½ per cent. dividend on £600,000 Preference Shares, less tax at 4s. in the £ ...	31,200	31,200
Ordinary Dividend, tax free ...	154,015	189,019
Written off	12,937	15,000
Loans from Associated Companies	28,100	28,100
Carried forward	3,843	3,188
Ordinary Dividend	11%	13½%

The preference shares were recently quoted at 23s. and the ordinary at 35s. 6d.

Although the volume of business done in white flour during 1929 was, generally speaking, unsatisfactory from the profit viewpoint, the milling of flour for brown bread appears to have maintained its remunerative level. For the financial year which terminated at March 31 last the amount of net profit realised by **Hovis, Ltd.**, was £89,777, which compares with £88,534 for the previous twelve months. The appropriation account is made up as under:

	£
Brought forward from 1928-1929 ...	21,498
Net Profit, year ended March 31, 1930	89,777
Disposable Balance	£111,275

	£
6 per cent. dividend on £150,000 Cumulative Preference Shares	9,000
15 per cent. dividend on £318,000 Ordinary Shares	47,700
Transferred to Reserve	25,000
Allocated to Staff Fund	7,000
Carried forward to 1930-1931	22,575
	£111,275

The company's reserve now shows a credit balance of £315,000, representing over 67 per cent. of the total issued capital. For the first time the goodwill is shown as a separate item on the balance sheet, the estimated value of this asset being £145,208,

and some of the main features of the certified accounts compare as under :

	Mar. 31, 1930.	*Mar.* 31, 1929.
	£	£
Net Profit	89,777	88,534
Preference Dividend	9,000	9,000
Ordinary Dividend	47,700	46,200
To Reserve	25,000	25,000
To Staff Fund	7,000	5,000
Debtors	180,651	233,841
Stocks	116,920	129,839
Cash	10,832	114,070
War Loan	202,160	151,283
Creditors	266,618	351,953
4 per cent. Debentures ...	60,000	60,000
Carried forward	22,575	21,498
Ordinary Dividend	15%	15%

The highest and lowest prices of the ordinary shares during 1929 were 68s. 3d. and 55s. 6d. respectively, and recently they changed hands at 58s. The preference shares at 21s. 10d. yield practically 5½ per cent.

That the linking of cakes and biscuits is a wise policy is proved by the very satisfactory results reported by **Scribbans and Co., Ltd.**, the well-known manufacturers of slab cake. After taking credit for the sale of certain investments, the gross profit for the year ended April 30 last amounted to £284,410, being an increase of £63,537 over the previous year's figure. Against this gross profit must be set the sum of £143,130 for the following :

	£
Written off the capitalised cost of a new business	4,031
Depreciation of wasting assets	9,785
Income Tax	36,663
Balance of Preliminary Expenses Account written off	92,651
	£143,130

The net profit was, therefore, £141,280 as against a net profit of £101,959 for 1928-1929, and, after adding the sum of £36,281 which was brought forward from the last appropriation account, the disposable balance was £177,561. This amount has been dealt with in the following manner :

	£	£
Interim dividend of 3 per cent. on £1,700,000 Ordinary Shares of £1 each	51,000	
Less tax at 4s. in the £	10,200	
		40,800
Final dividend of 4 per cent. on £1,700,000 Ordinary Shares (making 7 per cent. for the year)	68,000	
Less tax at 4s. 6d. in the £ ...	15,300	
		52,700
Dividend of 19⅞ per cent. on £200,000 Deferred Shares, less tax		31,167
Allocated to Development Account ...		35,000
Carried forward to 1930-1931		17,894
		£177,561

The following summary affords a comparison of some of the principal items, the present balance sheet being improved by the extinction of the preliminary expenses :

	1929-1930.	1928-1929.
	£	£
Gross Profit	284,410	220,873
Net Profit	141,280	101,959
Cash	39,810	165,905
Debtors	64,833	96,805
Stocks	61,251	67,952
Ordinary Dividend	93,500	68,000
Deferred Dividend	31,167	22,667
Carried forward	17,894	36,281
Ordinary Dividend	7%	5%

Recently the ordinary shares were quoted at 12s. 9d. and the deferred (1s.) shares at 1s. 10d.

The keen competition experienced in the milling trade is reflected in the final accounts of **Associated London Flour Millers, Ltd.**, which was registered nine years ago, and which controls **J. and H. Robinson, Ltd., Cannon and Gaze, Ltd., Samuel Kidd and Co., Ltd., Medway Milling Co., Ltd.**, and other grain companies. For the financial year which ended on March 31 last a loss of £527 was sustained after debiting directors' fees, which amounted to £1,400. The sum of £10,214 was brought forward from last year, and, after deducting the loss of £527, the balance of £9,687 was dealt with in the manner shown below :

	£
Dividend on Preference Shares allotted as purchase consideration	1,832
Transferred to Special Reserve	7,500
Carried forward	355
	£9,687

Some of the principal items enumerated on the balance sheet are the following :

	March 31, 1930.
	£
Creditors	9,173
Owing to Subsidiaries	256,732
Due from Subsidiaries	245,461
Sundry Debtors	4,362
Investments in Subsidiaries, at cost	1,364,300
Bank overdraft	93,041
7½ per cent. Cumulative Preference Shares ...	447,667
Ordinary Shares	833,043

The ordinary shares changed hands recently at 4s., while the preference shares, including more than three years' accrued dividend, are quoted at 12s. 3d.

Last year the dividend on the ordinary share capital of **Geo. Bassett and Co., Ltd.**, the Sheffield confectionery manufacturers, was raised from 17½ per cent. to 20 per cent., and the latter rate has now been maintained, the net profit for the year ended May 31 last amounting to £79,417 as compared with £77,315 realised during the previous twelve months. The sum of £20,000 has been added to the general reserve, which now stands at £40,000, and against £17,930 brought in from last year's appropriation the sum of £16,789 is being carried forward to 1930-1931. Last year only £10,000 was allocated to the reserve.

The progress made by **Brooke Bond and Co., Ltd.**, has been well maintained, the net profit for the year, which closed at the end of May, being £159,849. Last year a share bonus of 100 per cent. was distributed, and consequently, although the same sum has now been allocated as dividend, the actual rate has dropped from 15 per cent. to 10 per cent., the increased capital ranking for six months' dividend. The company's appropriation figures are as follows :

	£
Brought forward from 1928-1929 ...	14,489
Net Profit, Year ended May, 1930 ...	159,849
	£174,338

	£
10 per cent. dividend on £150,000 "A" Ordinary Shares	15,000
10 per cent. dividend on £150,000 "B" Ordinary Shares	15,000
10 per cent. dividend on £300,000 "B" Shares, for six months	15,000
Allocated to Reserve	100,000
Carried forward to 1930-1931	29,338
	£174,338

The financial strength of the business is shown by the following comparative balance sheet items :

	1929-1930.	1928-1929.
	£	£
Stocks	1,007,685	1,061,383
Cash	180,989	73,924
Debtors	83,076	140,040
Creditors	713,206	821,077
Bank Loan	5,166	176,697
Due to Subsidiaries	80,736	177,993
Insurance Contingency and Taxation Reserve	367,775	148,976
Advances to Subsidiaries ...	221,605	267,161
Investments in Subsidiaries ...	293,004	281,745
Properties	83,782	92,190
Plant	45,990	56,417

The " A " shares were recently quoted at 49s., and the " B " shares—which carry no voting rights—at the same price.

In the matter of weighing machine manufacture, profits have been fairly well maintained, and in some cases increased. The net profit realised by **W. and T. Avery, Ltd.**, amounted to £119,482 for the financial year to March 31 last, being an increase of £6,123 over the profit for the previous twelve months, the appropriation account being made up as under :

	£	£
Brought forward from 1928-1929 ...	54,328	
Net Profit, Year ended March 31, 1930	119,482	
	173,810	
5 per cent dividend on £134,230 " A " Preference Shares, less tax		5,380
5½ per cent. dividend on £147,128 " B " Preference Shares, less tax		6,474
Ordinary Dividend, 15 per cent.		82,932
Transferred to Reserve		20,000
Carried forward to 1930-1931		59,035
		£173,810

At the recent price of 54s. 6d. the ordinary shares, which are of £1 denomination, give a yield of well over 5½ per cent. The " A " preference shares of £5 stand at 4¾, and the " B " £1 preference changed hands recently at 20s. 6d.

FOOD INDUSTRY STOCK AND SHARE LIST

	August, 1930.	*Par Value.*
Aerated Bread : Ord.	17/6	£1
6½% Pref.	19/-	£1
Apollinaris : Ord.	7/6	£1
Assoc. Biscuit : 6½% Pref.	23/-	£1
Avery (W. and T.) : Ord	54/6	£1
Bovril : Ord.	24/6	£1
Deferred	39/	£1
6% Pref.	21/9	£1
4½% Deb.	86	£100
British Aluminium : Ord.	39/6	£1
6% Pref.	21/-	£1
British Thomson Houston : 7% Pref. ...	22/-	£1
Cadbury : 8% 2nd Pref.	26/10	£1
Carrs : 6½% Pref.	20/6	£1
Cerebos : Ord.	5 15/16	£1
Chivers : 6% Deb.	100	£100
Cinzano : 7½% Pref.	21/9	£1
Clark's Bread : Ord.	20/-	10/-
Crosse and Blackwell : Ord.	1/10	1/-
7½% Pref.	10 10	15/-
English Margarine : Pref.	22/6	£1
Foster Clark : Ord.	47/9	10/-
Fry's : 8% " B " Preferred	21/10	£1
H.P. Sauce : Ord.	95/6	£1
Hill (W.) : Ord.	5/8	£1
Home and Colonial : Ord.	13/-	4/-
15% Cum. Ord.	45/7	£1
6% Cum. Pref.	5 1/16	£5
Hovis : 6% Cum. Pref.	21 10	£1
Imperial Chemical : Ord.	20 6	£1
Deferred	5/9	10/-
7% Cum. Pref.	21/9	£1
International Tea : Ord.	20/10	5/-
6% 1st Pref.	20/3	£1
7% " A " Pref.	22/2	£1
Liebigs : (Reg.)	14 3/8	£5
(Bearer)	14 7/8	£5
5% Pref.	96/3	£5
Lipton : Ord.	5/2	1/-
5% 1st Pref.	8/2	10/-
6% Pref.	9/-	10/-
6% Deb.	96	£100
Lyons : Ord.	97/6	£1
" A " Ord.	97/6	£1
5% Pref.	19/8	£1
6% Preferred Ord.	21/4	£1
7% Pref.	26 6	£1
8% Pref.	27 10	£1
Maypole Dairy : 20% Preferred	14/6	5/-
Deferred	5/-	2/-
5% Pref.	19 2	£1
Meadow Dairy : 7½% Pref.	23 3	£1
Nathan (J.) : Ord.	2/3	1/-
7% Pref.	15/9	£1
8% Preferred	8/-	10/-
Nestlés : 8% Pref.	28/7	£1
Pascall (J.) : 8% Preferred	10 8	£1
Peak Frean : 5% Pref.	17/2	£1
8% " A " Pref.	26/-	£1
Radcliffs Edible : Ord.	2/2	1
8% Pref.	9/-	10/-
Radiation : Ord.	35/3	£1
6% Pref.	22/-	£1
Scribbans : Ord.	12/9	£1
Deferred	1/10	1/-
Schweppes : Deferred	34/10	£1
4% Deb.	75	£100
Smith's Potato Crisps : Ord.	8/6	5/-
Spiers and Pond : Ord.	16/2	10/-
6½% Pref.	20/-	£1
5% Deb.	95	£100
Spillers : Ord.	18/9	£1
6% Pref.	18/6	£1
Deferred	5/9	£1
Tate and Lyle : Ord.	37/6	£1
6½% Pref.	22/10	£1
Unilever : Ord.	53/-	£1
7% Preferred	23/3	£1
Union Cold Storage : 6% Pref.	10 10	£1
7% Pref.	21/-	£1
10% Pref.	26/-	£1
United Caterers : Ord.	6d.	5/-
United Dairies : Ord.	31/-	£1
6% Pref.	20/8	£1
United Glass Bottle : Ord.	22/-	£1
United Molasses : Ord.	36/-	£1

FOOD MANUFACTURE is sent to any address in the World for 10s. per annum. Send your subscription now to LEONARD HILL, LTD., Thanet House, 231-2, Strand, London, W.C. 2.

New Companies

STEVENS' BAKERIES, LIMITED. (249690.) "Clapham House," 125, Albany Road, Camberwell, S.E. 5. To take over the bus. of a wholesale baker, confectioner, and pastrycook cd. on at 20, The Pavement, Clapham, S.W., by J. Stevens. Nom. Cap.: £10,000 in £1 shares (9,000 "A" and 1,000 "B").

KNIGHTSBRIDGE PROVISION COMPANY, LIMITED. (249661.) 92, Libra Street, Old Ford, E. To carry on the bus. of mnfrg. brawn, tongue, sausages, pies, and meats, and tins and other receptacles, etc. Nom. Cap.: £3,000 in £1 shares.

URWIN, BOOTH AND COMPANY, LIMITED. (249720.) To take over the bus. of a baker and confectioner cd. on at 9, Blackpool Road, Preston, as "C. W. Urwin." Nom. Cap.: £1,000 in £1 shares.

POPLE, LIMITED. (249713). To take over the bus. of a pastrycook, baker, and confectioner cd. on at 98, High Street, Huntingdon, as "A. Pople." Nom. Cap.: £2,000 in £1 shares.

WHITE'S (KENSAL), LIMITED. (249234.) 108, Chamberlayne Road, Kensal Rise, N.W. 10. To take over the bus. of wholesale and retail tobacconists, confectioners, and newsagents, cd. on at Chamberlayne Road, N.W. 10, and elsewhere as "G. White," and at 384, Uxbridge Road, N.W. 10, as "G. Webb." Nom. Cap.: £15,000 in 10s. shares.

C. RUTTER, LIMITED. (249552.) 98, West Dock Avenue, Hull. To carry on the bus. of retail fishmongers, etc. Nom. Cap.: £2,000 in £1 shares.

OWEN LANGHAM, LIMITED. (249263.) 22, Basinghall Street, E.C. 2. To carry on the bus. of grocers, provision merchants, confectioners, corn chandlers, etc. Nom. Cap.: £600 in £1 shares.

BRISTOL GROCERS, LIMITED. (249581.) 10, Dumfries Place, Cardiff. To carry on the bus. of grocers and provision merchants, etc. Nom. Cap.: £1,000 in £1 shares.

HENRY'S DAIRIES, LIMITED. (249585.) To take over the bus. of dairymen carried on at 44, Victoria Road, Higher Tranmere, Birkenhead, as "Henry's Dairy." Nom. Cap.: £2,000 in £1 shares.

HENRY MOWBRAY AND CO., LIMITED. (249600.) St. Dunstan's Buildings, St. Dunstan's Hill, E.C. 3. To carry on the bus. of grain, produce, oil, seed, or any other kind of brokers, etc. Nom. Cap.: £500 in £1 shares.

ALLIED STORES, LIMITED. (249406.) 179-189, City Road, E.C. To take over (*a*) all or part of the business, property, rights, and liabilities of the Home and Colonial Stores, Ltd., the Meadow Dairy Co., Ltd., the Maypole Dairy Co., Ltd., Pearks' Dairies, Ltd., and the International Tea Company's Stores, Ltd., and (*b*) all or any of the issued shares of Lipton, Ltd. Nom. Cap.: £100 in 25 "A" preference, 25 "B" preference, and 25 preferred shares of £1 each and 100 ordinary of 5s. each.

BIRKETT AND ROBERTS, LIMITED. (249357.) Church Lane, Goldenhill, Staffs. To carry on the bus. of wholesale and retail bakers and flour dlrs., etc. Nom. Cap.: £3,000 in £1 shares.

HARRIS AND SONS (HINDHEAD), LIMITED. (249364.) To take over the bus. of retail grocers and provision merchants carried on as Harris and Sons at Grayshott, Hants. Nom. Cap.: £2,000 in £1 shares.

INGRAM BROWN, LIMITED. (249346.) To take over the bus. of wholesale grocers cd. on at 219, Lozells Road, Birmingham. Nom. Cap.: £6,000 in £1 shares (1,000 preference and 5,000 ordinary).

ROUVINE, LIMITED. (249624.) 3, Three Tuns Court, Borough High Street, S.E. 1. To take over the bus. of a mnfr. and seller of a preparation for improving gravy soups, known as "Rouvine," and cd. on by E. V. Varley at Three Tuns Court, S.E. Nom. Cap.: £100 in 1s. shares.

MOSS BROTHERS (GROCERS), LIMITED. (249568.) 27, Burdett Road, Mile End, E. 3. To carry on the bus. of wholesale and retail grocers, provision merchants, etc. Nom. Cap.: £1,000 in £1 shares.

G. E. HERNE AND COMPANY (LONDON), LIMITED. (249560.) 37-38, Mark Lane, E.C. 3. To carry on the bus. of merchants, importers and exporters of and dlrs. in farina, dextrine, starch, grain, provisions, etc. Nom. Cap.: £1,000 in £1 shares.

SMITH'S POTATO CRISPS (OVERSEAS), LIMITED. (249572.) 45, Bloomsbury Square, W.C. 1. To acquire the right to exploit outside Great Britain the secret processes and other rights of Smith's Potato Crisps (1929), Ltd., and to carry on the bus. of mnfrs. of and dlrs. in potato crisps, etc. Nom. Cap.: £30,000 in £1 shares.

J. NATHAN (1930), LIMITED. (249452.) 22, North End Road, Golders Green, N.W. 11. To take over the bus. cd. on at Golders Green, together with the assets as on June 11, 1930, by M. Isaacs, and to carry on the bus. of butchers, dairymen, farmers, grocers, etc. Nom. Cap.: £500 in £1 shares.

MANCHESTER PICKLE CO., LIMITED. (249394.) 22, Holland Street, Salford, Lancs. To take over the bus. of pickle and sauce mnfrs. and mchts. cd. on at Salford as the Manchester Pickle Company. Nom. cap.: £200 in £1 shares.

CONTINENTAL HEALTH WATER SUPPLY, LIMITED. (249445.) 8-9, Essex Street, Strand, W.C. 2. To manufacture, preserve, aerate, mineralise, bottle, and deal in health, mineral, and aerated waters and other liquids, etc. Nom. Cap.: £2,000 in £1 shares.

GEORGE KNOWLES, LIMITED. (249449.) To take over the bus. of butchers and meat salesmen cd. on at Crayke, near Easingwold, Yorks. Nom. Cap.: £600 in £1 shares.

BEDDINGTON MINERAL WATER COMPANY, LIMITED. (249410.) High View, Plough Lane, Beddington, Surrey. To carry on the bus. of mnfrs. of and dlrs. in mineral, aerated, and artificial waters, etc. Nom. Cap.: £550 in £1 shares.

FYFFE'S STORES, LIMITED. (249506.) 142, Kensington, Liverpool. To take over the bus. of grocers and provision merchants cd. on at Kensington and 112, Lodge Lane, Liverpool. Nom. Cap.: £3,000 in £1 shares.

A. J. STANT, LIMITED. (249515.) 14, Central Buildings, 41, North John Street, Liverpool. To take over the bus. of a baker and confectioner cd. on at 115, Eccles New Road, Salford, by A. J. Stant. Nom. Cap.: £1,000 in £1 shares.

PANIWALLA TEA, LIMITED. (249842.) Finsbury House, Blomfield Street, E.C. 2. To carry on the bus. of wholesale and retail grocers and genl. storekeepers, etc. Nom. Cap.: £100 in 1s. shares.

CHEF PRODUCTS, LIMITED. (249828.) 20, Soho Square, W. To carry on the bus. of mnfrs., importers and exporters of and dlrs. in preserved provisions, etc. Nom. Cap.: £100 in £1 shares.

A. W. PARKER, LIMITED. (249820.) 35, Imperial Buildings, Oxford Road, Manchester. To take over the bus. of butchers cd. on at Claremont Road, Moss Side, Manchester, and at Altrincham, Cheshire, and Urmston, near Manchester, by E. Bloor and W. Dent. Nom. Cap.: £2,500 in £1 shares (2,000 ordinary and 500 unclassified).

T. J. ALLARDYCE, LIMITED. (249805.) 63, Church Road, Kingsland Road, N. 1. To enter into an agmt. for the sale to the company of 12, Church Street, Stoke Newington, the grant of a lease of 98, Green Lanes, Stoke Newington, the sale of the fixtures, etc., on the said premises, and the acquisition of the bus. of a baker and confectioner cd. on thereon. Nom. Cap.: £5,250 in 5,000 "A" ordinary shares of £1 and 5,000 "B" ordinary shares of 1s.

HARRISONS (RODLEY), LIMITED. (249736.) Calverley Bridge, Rodley, Leeds. To take over the bus. of a mnfr. of boiled sweets and other confections and sundries cd. on at Calverley Bridge as The New Geisha Confectionery Co., and also the bus. of a "chocolate and cigarette club" cd. on at Rodley as W. H. Harrison. Nom. Cap.: £3,500 in 10s. shares.

Current Literature

Fruit and Vegetable Products

329. Five Years' Clinical Experience with Lemon Juice Milk. L. H. Barenberg, H. Abramson, and W. H. Messer. (*Amer. Journ. Dis. of Children*, Chicago, 1930, Vol. 39, May, p. 949.)

330. Removal of Spray Residue from Pears and Apples. (1929 Fruit Season.) F. W. Pettey. (*Union of Sth. Africa Bull.* No. 63.)

331. Fermented and Unfermented Fruit Juices and Mineral Waters. A. Hartmann. (*Schweiz. Ztschr. f. Hyg.*, 1929, Vol. 9, pp. 493-504.)

332. Control of Spoilage in Tomato Products. Carl S. Pederson and Robert S. Breed. (*N.Y. State Agricultural Exp. Station Bull.* No. 570, Aug., 1929.)

333. The Types of Organisms found in Spoiled Tomato Products. Carl S. Pederson. (*N.Y. State Agricultural Exp. Station Tech. Bull.* No. 150, July, 1929.)

334. Viscosity of Pectin Sols.—II. Effects of Citric Acid and Various Sugars. A. Ohn. (*Ind. Eng. Chem.*, 1930, p. 635.)

335. Principles and Practice of Preserving Fruits and Fruit Products by Freezing. M. A. Joslyn. (*Fruit Prods. J.*, 1930, July, p. 336.)

336. Formulas for Spicing and Flavouring by Modern Methods. H. Bennett. (*Ibid.*, p. 343.)

337. General Principles of Retort Operation. K. L. Ford. (*Ibid.*, p. 340.)

338. Sodium Benzoate in Fruit Juices. (*Ibid.*, p. 345.)

339. Microscopic Identification of Marmalades. W. Oether. (*Z. Unters. Lebensmittel*, 1930, p. 132.)

340. Cannery Tomatoes. F. W. Geise. (*Maryland Agr. Expt. Sta., Bull.* 318, 1929, p. 255.)

341. Factors Responsible for Disintegration of Canned Tomatoes. C. Appleman and C. Conrad. (*Canning Trade*, 1930, April 14, p. 20.)

342. Prune Storage and Maturity Studies. Vincent, Verner, and Blodgett. (*Idaho Agr. Exp. Sta. Bull.* 167, 1929.)

343. Development and Ripening of Peaches. Nightingale, Addoms, and Blake. (*N.J. Agr. Exp. Sta., Bull.* 494, 1930.)

344. The Vitamin B Content of Vegetables. House, Nelson, and Haber. (*Iowa Agr. Exp. Sta., Research Bull.* 120, 1930.)

Dairy Products

345. Nutritional Value of Raw and Cooked Egg Yolks. A. Scheunert and E. Wagner. (*Deut. Med. Woch.*, 1929, Vol. 55, pp. 395-396. 1 Chart, 8 refs.)

346. Bacteriological Basis for the Effective Pasteurisation of Ice-Cream. Report of the Committee on Dairy Products and Eggs presented to the Food, Drugs, and Nutrition Section of the Amer. Pub. Health Assoc. Fifty-eighth Annual Meeting, Minneapolis, Minn., October 4, 1929. (*Amer. Journ. Pub. Health*, 1930, Vol. 20, May, pp. 492-494.)

347. Viscosity of Milk and Milk Products. W. Mohr and F. Oldenburg. (*Milchwirt. Forsch.*, 1929, pp. 429 and 576.)

348. Electrical Conductivity of Milk. J. Krenn. (*Z. Unters. Lebensm.*, 1930, p. 32.)

349. Titrimetric Determination of Lactose in Milk. H. Gohr. (*Ibid.*, p. 90.)

350. Determination of Chlorine and Sugar in Small Quantities of Milk. F. Münchberg. (*Milch. Zentr.*, 1930, p. 161.)

351. Dyes as an Indication of Adulteration in Butter. D. Henville and W. M. Paulley. (*Analyst*, 1929, p. 413.)

352. Adulteration of Butter and Ghee with Animal Fat and Vegetable Ghee and its Detection. (*Mem. Dept. Agric. in India.* Pusa. Chem. Ser., 1929, Vol. 10, pp. 143-155. 2 Charts and 1 pl., 15 refs.)

353. Bacteria in Cheese. (*Med. Press and Circ.*, 1929, Vol. 179, August 14, p. 120.)

Various

354. Production, Preparation and Inspection of Imported Meat. T. Dunlop Young. (*Journ. State Med.*, 1929, Vol. 37, September.)

355. The Source of the Agent causing Reddening of Food preserved with Salt. H. Velu. (*C. R. Soc. Biol.*, 1929, Vol. 100, pp. 1094-1095. 2 refs.)

356. Experimental Production of the Agent causing Reddening of Food preserved with Salt by Rapid Mutation of the *Erythrobacillus prodigiosus*. H. Velu and L. Balozet. (*Ibid.*, pp. 1095-1096. 1 ref.)

357. Certain Acid Tolerant Bacteria causing Spoilage in Canned Foods. C. T. Townsend. (*Zent. f. Bakt.*, II. Abt., 1929, Vol. 78, pp. 161-172.)

358. The Toxicity of Aluminium Compounds in Foods. E. V. McCollum, O. S. Rask, and J. E. Becker. (*Bull. Soc. d'Hyg. Alimentaire*, 1929, Vol. 17, pp. 65-73. 4 refs.)

359. Beverages. Report of the Committee to the Food, Drugs and Nutrition Section of the Amer. Pub. Health Assoc. at the Fifty-seventh Annual Meeting at Chicago, p. 111, October 16, 1928. (*Amer. Journ. Pub. Health*, 1929, Vol. 19, May.)

360. Inspection of Marketable Fish and how to distinguish the various Species of Fish. (*J. Roy. San. Inst.*, 1929, Vol. 50, pp. 373-381.)

361. The Bacteriological Control of Shell-fish. J. W. Bigger. (*Journ. of Hyg.*, Vol. 29, pp. 62-70.)

362. The Unpopularity of Frozen Meat. Coronado. (*Ann. d'Hyg. Pub. Indust. et Sociale*, 1929, Vol. 7, pp. 403-423.)

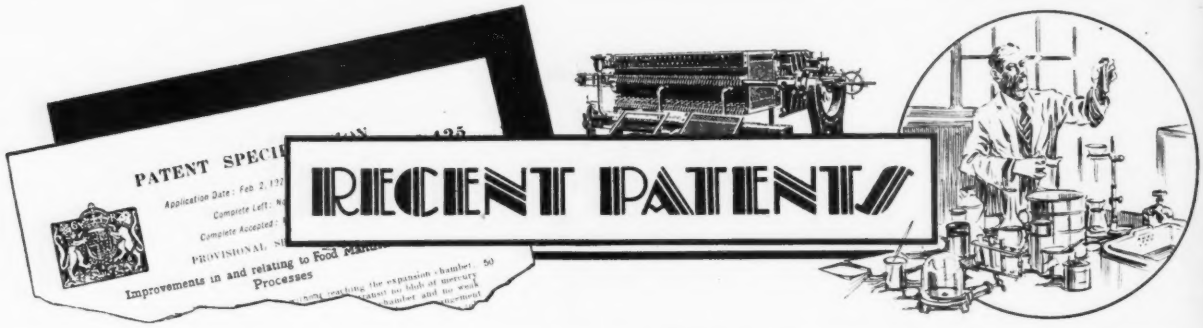
363. When are Meats or Fish Spoiled? (*Amer. Journ. Pub. Health*, 1929, Vol. 19, April.)

364. The Relation of Pathology and Bacteriology to Meat Inspection. M. Müller. (*Deut. Tierärzt. Woch.*, 1929, Vol. 37, pp. 84-87.)

365. The Organisation of Meat Inspection in Switzerland. A. Krupski. (*Journ. State Med.*, 1929, Vol. 37, September, pp. 502-505.)

366. Some Recent Food Investigations. S. Dixon. (*J.S.C.I.*, 1930, No. 32, p. 663.)

367. Formulæ for Direct Calculation of Sucrose and Lactose Content of Milk-Chocolate. A. Rinck and E. Kaempf. (*Z. Unters. Lebensm.*, 1930, p. 81.)



These particulars of New Patents of interest to readers have been selected from the Official Journal of Patents, and are published by permission of the Controller of H.M. Stationery Office.

Latest Patent Applications

22661. SWIFT AND CO.: Treating food carcases. July 28.
21570. DAHO, E.: Production of dietic foods. July 16.
21388. LIVERPOOL REFRIGERATION CO., LTD. AND ZAROTSCHENZEFF, M. T.: Chilling, etc., foodstuffs. July 15.
21224. LEOBEN, W.: Manufacture of artificial fruits, etc., with edible centres. July 14.
21801. MURRAY, MILTON AND CO. AND SCHOTZ, S. S.: Food preparations. July 18.

Specifications Published

332,647. TARONI, C. E., PRESCOTT, W. E., BAKER PERKINS, LTD., AND ANCIENS ÉTABLISSEMENTS A. SAVY, JEAN JEAN, ET CIE. SOC. ANON.: Confectionery and the like.
332,669. GATES, W. R. B. ST. J., TAVROGERS, J., AND COW AND GATE, LTD.: Preventing rancidity in dried or powdered milk and milk foods or preparations.
332,847. WANKLYN, K. P. AND STACY, F.: Treatment of wheat-germ for use as an edible food substance.
332,209. MILANI, E.: Preserving food products.
311,315. LEVIN, E. I.: Method of manufacturing a pure constant yeast.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Recent Trade Marks

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal," and is published by permission of the Controller of H.M. Stationery Office.

SILVERDALE.—513,401. **Tea.** UNITED KINGDOM TEA CO., LTD., Empire Warehouses, Paul Street, London, E.C. 2. Aug. 6.

DENE VALLEY.—513,852. **Butter.** C. AND E. WALKER, LTD., Wellington, Somerset. Aug. 6.

SEMLOH.—513,984. **Preparations for making beverages.** STUART'S (SOWERBY), LTD., Stuart's Works, Denby Place, Tuel Lane, Sowerby Bridge, Yorkshire. Aug. 6.

CULLEN.—499,497. **Tea.** CULLEN ESTATES, LTD., Union Place, Slave Island, Colombo, Ceylon. July 30.

"BUZZARD."—499,766. **A cereal food for human consumption.** H. C. TOOLEY, LTD., 26, North Street, Leighton Buzzard, Bedfordshire. July 30. (Associated.)

FOUR SQUARE.—512,707. **Condensed milk.** LEON MOOCHRIK, trading as J. C. RATNER AND CO., 146, Bishopsgate, London, E.C. 2. July 30.

SANT-AMINA.—512,371. **Beverages (not alcoholic, not aerated, and not medicated), biscuit flour, and bread flour.** AUGUSTE VICTOR KELLER, 10, Valley Green, Welwyn Garden City, Hertfordshire. July 23.

OLD COMRADES.—498,099. **Tea.** CHARLES STANSFELD HICKS, Mincing Lane House, 59, Eastcheap, London, E.C. 3. July 16.

HYGEIA.—512,873. **Dried fruits.** BARRY BROTHERS, LTD., 37, Victoria Street, Liverpool. July 16.

BILLY BOY.—513,333. **Tea, coffee, chicory, tinned fruit, cheese, mustard, pepper, and tinned fish.** CHARLES WALTER BECKETT, trading as UNITED TEA AND PRODUCE CO., 6, Lower Teddington Road, Hampton Wick, Kingston-on-Thames. July 16. (By Consent.)

SALDIS.—513,348. **Salt for food.** NEW CHESHIRE SALT WORKS, LTD., Wincham Lane, Wincham, Northwich, Cheshire. July 16.

512,488. **Illustration of a seaside scene. Shrimps.** The Firm trading as THE PARKGATE PRODUCTS CO., "Madriguera," Station Road, Parkgate, Cheshire. July 16.

London Gazette Information

TRADE BOARDS ACTS, 1909 AND 1918.

SUGAR CONFECTIONERY AND FOOD PRESERVING TRADE BOARD (GREAT BRITAIN).

Proposal to Vary certain Overtime Rates for Male and Female Workers.

In accordance with Regulations made under Section 18 of the Trade Boards Act, 1909, by the Minister of Labour, dated April 21, 1927, the Sugar Confectionery and Food Preserving Trade Board (Great Britain) give notice that they propose to vary the Overtime Rates set out in their Notice F (11), dated April 6, 1923, for Male and Female Workers in respect of time worked on certain Holidays as shown in the Schedule below.

NOTE.—This Notice is in substitution for the Notice F (12), dated July 1, 1930, which is withdrawn.

SCHEDULE.

Proposed Variation of Overtime Rates.

The Trade Board propose to vary the overtime rates for male and female workers by providing that the following words be substituted for the words "the days allowed as holidays under Section 35 of the Factory and Workshop Act, 1901," contained in the Proviso to Section 1 and in Section 2 (3) of Part III. of the above-mentioned Notice F (11):

"Customary Public and Statutory Holidays (so far as it is lawful under the Factory and Workshop Acts and any other legislation governing employment for the worker to work during such time)."

Pursuant to Section 3 (5) of the Trade Boards Act, 1918, the Trade Board will consider any objections to the above proposal to vary which may be lodged with them within two months from July 29, 1930. Such objections should be in writing and signed by the person making the same (adding his or her full name and address), and should be sent to the Secretary, Sugar Confectionery and Food Preserving Trade Board (Great Britain), 1, Whitehall Gardens, S.W. 1.

It is desired that the objections should state precisely, and, so far as possible, with reasons, what is objected to.